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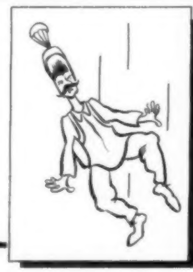

This periodical contains the most accurate information currently available on the subject of aviation accident prevention. Contents should not be construed as regulations, orders or directives unless so stated. Material extracted from Aircraft Accident Reports, OpNav Form 3750-1 and Anymouse (anonymous) Reports may not be construed as incriminating under Art. 31, UCMJ. Names used in accident stories are fictitious unless stated otherwise. Photo Credit: Official Navy or as credited. Original articles may be reprinted with permission. Contributions are welcome as are comments and criticisms. Address correspondence to Director, U. S. Naval Aviation Safety Center, NAS Norfolk 11, Va.

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IN THIS ISSUE

COVER:

On this month's cover is the picture of one of the most persistent problems of naval aviation. The excellent photograph was sent us by Lt. Max Morris, ASO of VF-101, whose letter on the subject appears on Page 2.

IN THIS ISSUE

Letters to the Editor

Sir:

"Never eat the liver of a polar bear," indeed! (October 1956 *Approach*). I wouldn't even get within radar distance of the things, much less try to kill one for chow.

I quote from a recent issue of a popular magazine: "this mammoth of the ice is one of the world's most dangerous animals. Eskimos, and the few white men who have hunted him, consider themselves mighty heroes when they have downed this beast. And well, they might, for he is an animal who will deliberately stalk man."

Who's willing to be a hero now? I prefer to depend on Air Sea Rescue food drops.

IAN TOMLINSON

The reason you shouldn't eat polar bear liver is its high concentration of vitamin A. Three ounces are more than sufficient for man's yearly requirement. Though the liver isn't poison, too great an intake of vitamin A causes toxic effects and sickness. The eskimos, however, believe that the polar bear carried a "spell" in his liver and say that misfortune, even death, comes to him who eats it.

Is the snack bar always secured there, too?—Ed.

Sir:

I thoroughly enjoyed the articles on winter flight operations in the October 1956 issue of *Approach*. It was noticed, however, that one of the hazards of winter flight operations was not mentioned. That hazard is the possibility of reduced forward visibility when using reverse propeller thrust while operating on snow covered runways.

I am enclosing a clipping from the July 9, 1956 issue of *Aviation Week* which describes an accident in which reduced visibility, which occurred while using reverse propeller thrust, was a contributing factor. I sincerely hope this material will be of use to you.

As assistant wing staff commander of Air Wing Staff 75 at NARTU Lakehurst, I have observed that few publications hold the attention of the Weekend Warriors like *Approach*. Each issue is thoroughly digested by the members of the squadrons attached. Congratulations on the fine job you are doing.

P. R. ADAMS
CDR USNR-R

Thanks for the clipping. Outfits not having July 9 Aviation Week *available, may request copies of CAB report from Literature Department, Naval Aviation Safety Center, NAS Norfolk, Va.—Ed.*

Sir:

On pages 16 through 19 of the November 1956 issue, you give a simplified version of stability that has merit, but basically purveys "*fear*." Should not the aviator treat high angle of attack and stability like the sailor treats the sea?—namely with knowledge and respect, but not *fear*. Your adage "keep it moving" can be disastrous also, for approach and landing speeds have upper as well as lower limits, on carriers as well as fields and, further, keeping it moving too fast too close to the deck has serious control problems.

Your article appeared to try to simplify stability and as a result seems incomplete. Are you speaking of subsonic, transonic and supersonic stability? If so, the deteriorating effect of mach number on directional stability is in conflict with your statements of low angle stability.

Further, the difficulties, and even aircraft destruction, associated with yaw-roll inertial and aerodynamic coupling were ignored. At very high IAS (high q) the angle of attack is low, but wing torsional effects may ruin your ability to roll. Incidentally, the use of cathedral is not forbidden in design, e.g., the F-104 with straight wings and negative dihedral.

Further, low aspect ratio is a much used effective tool to counteract some of the effects of high angle of attack and stall associated with sweptwings.

The intent of your article is considered very good but it is recommended that the assumptions, simplifications and limits of the article be defined. Again, it is recom-

More on next page

Letters to the Editor
Continued

mended that knowledge and respect be stressed, and not *fear.*

I found that I was not the only one in the squadron critical of the article.

F. X. TIMMES, CDR, USN
CO, Fighter Squadron 154

Our thanks for your comment—we can only murmur that if all our readers were as well versed on the subject, we'd soon be out of business. Our "oversimplification" is aimed at what we believe to be a considerable number of less well-informed pilots. And because we keep a hopeful eye peeled for better ways to express problems of flight, how about writing us an article on the subject?—Ed.

Sir:

The following suggestion is offered as a "before touchdown" checklist to provide reassurance to pilots that the aircraft is set up for a safe landing. It is recommended that it be accomplished following the "before landing" checklist while on the base or final leg.

The GUMP check:

Gas—Adequate and on landing tanks
Undercarriage—Wheels down-and-locked
Mixture—Full Rich
Propellers—full low pitch

It is not original: It was learned from an Air Force major who used it effectively in instruction of Chinese students in the B-25 during World War II.

K. F. MUSICK
CO, VR-8

Though more applicable for props, this or any good system (including one item known to a few as a cockpit checklist) can keep you from becoming a scrapegoat—like many, many others during 1956!—Ed.

Sir:

Numerous warning devices designed to prevent wheels-up landings are aimed at interrupting the pilot's concentration on the task he is engaged in, for example, warning lights, horns, bells, flares and wheel watchers.

Instead of trying to distract the pilot, why not capitalize on this concentration and place the warning device exactly where the pilot is looking—on the spot he is attempting to land on. A fabric banner with the words "unsafe" printed on it could be raised as required, could be placed on the approach end of the runway. These lights would form the word "Unsafe" and could be operated by the tower.

To make this warning device simple, a battery of three to five red lights aimed into the approach path of a landing aircraft might serve the same purpose. But in all cases the warning device should be located right where the pilot is looking during the final approach—on the runway—not in the cockpit or to the side of the runway.

HENRY HART
Major, USMC

We hope something will be done soon, too, to help pilots avoid wheels-up accidents. But no device will alter your or my responsibility as professional pilots.—Ed.

Sir:

In regard to the remote flare gun installation to initiate wheels-up approaches mentioned in paragraph 4b(1) of OpNav Instruction 3750-.7A, here is a picture of an installation we have operating in our squadron. The actual installation was fabricated locally by Gillette, R. N., AOC, from materials the squadron had on hand.

Chief Ordnanceman R. O. Gillette demonstrates remote multi-flare gun installation designed by VF-101 and in use at NAS Cecil Field. Please see front cover for photo of 4-gun double-flare salvo taken at night during test trials.

The pistols are standard issue flare pistols with handles and hammer assemblies removed. Firing pins are struck directly by MK II bomb-shackle release mechanisms which are surplus items from former usage in P2V squadrons.

These shackle releases have an automatic switchover built in which allows automatic firing of singles, doubles or salvo.

The system is fired by the control handle laid out at the end of 1000 feet of No. 12 three-wire cable. Power is supplied by the 28-volt generator which supplies current to the runway duty officer's radio, but could be supplied by a battery. The remote gun plus reel for handling the cable are mounted on a 3' x 5' trailer fabricated by FASRon 9.

Placing this remote installation 1000 feet down the runway from the runway duty officer fixes the firing location of the flares well ahead of the landing airplane. This advantageous positioning of the signal, plus the elimination of time lag for manual firing of the flare pistol and the reliability inherent in having up to four flares instantly available will give a much greater margin of safety in visually waving off a wheels-up approach. Further, it is not subject to garbling or to a busy radio circuit, and is instantly clear to the pilot of the approaching aircraft that he is not to land.

The equipment has been thoroughly tested. Over 500 dry runs and 55 live runs have been made without a misfire of the solenoids. The unit is easily waterproofed and has been fired while being sprayed with water.

Sketches of the gun installation, control handle, wiring diagrams and photos of the mounting are available to any station or unit desiring to make their own or a similar system by writing to me.

LT MAX K. MORRIS
Aviation Safety Officer (VF-101)
NAS Cecil Field, Jax

Good work. Your design was forwarded to BuAer.—Ed.

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Safety Council Notes

Excerpts from some of the Navy's 88 Safety Councils throughout the world, who provide local leadership and emphasis to the naval aviation safety program.

Flameout Drill—Friday is "simulated flameout approach day" for VA-63. This does not eliminate such approaches on any other day and the squadron pilots are encouraged to make simulated flameout approaches whenever possible, logging them for the record.

For loss of communications on simulated instrument flights the squadron has a procedure set up whereby the chase pilot flys ahead of the pilot on instruments, insuring that he gets jet wash. Whenever the pilot on instruments feels jet wash or anything which might be jet wash, he must go contact. Then he is to call the chase pilot and inform him (in the blind if necessary) that he is contact. *Re Lost Contact. This procedure, when required, should be used with caution.—Ed.*

All Hands Policemen—All hands seeing violations of taxi speeds and/or reckless driving of vehicles in the vicinity of aircraft are requested to report the incident immediately so that prompt action can be taken.—*ComFAir-Japan AvSafCouncil*

Medical Survey of Pilots Involved in Accidents—A *confidential* sociological, physiological and psychological survey of pilots involved in pilot-caused accidents is being undertaken by flight surgeons in CNABaTra to extend and expand aircraft accidents investigation. Mechanical investigation of accidents is very extensive. In the past the investigation of the pilot has not been as extensive. At the same time, the greatest number of accidents are in the pilot-caused category. The CNABaTra questionnaires to be filled out by the pilot with the assistance of the flight surgeon, is held in strict confidence and is used only in an attempt to discover the possible causes of various pilot-error type accidents.—*CNABaTra*

Deferred Emergencies and Arresting Gear. — Pilots encountering emergencies are prone to forget to request that arresting gear on airfields be rigged when there is sufficient time to do so prior to the landing. Tower operators are therefore being briefed to ask pilots declaring an emergency if they desire the wire raised. Pilots are also being briefed to drop the hook even though the wire is not raised since an excellent probability exists that the wire will be picked up anyway.—*FAir Alameda—NABs 12ND*

Tonight we are going to visit the Naval Aviation Safety Center in Norfolk, Virginia for a report on the wheels-up landing situation. There are now some 8,773 sets of retractable wheels on naval aircraft. A better understanding of the factors behind the problem might prevent a discouraging number of these wheels from remaining within their wheelwells during furure landings.

THIS is the wheels-up landing story. For naval aviation, that story began in the early nineteen thirties, when a relatively new airplane manufacturer, Grumman, built a stubby bi-plane carrier fighter designated the FF1. For practical purposes, this was the first Navy airplane to have retractable landing gear—it also marked the beginning of a problem which still lacks a satisfactory solution. For while the exact number of wheels-up landings occurring through the years will probably never be known, there are figures to describe the current seriousness of the problem.

In 1955 there were 42 unintentional wheels-up landings in naval aviation. In the first nine months of 1956, according to CNO, there were 48 wheels-up landings which cost an estimated $7,680,000. At this rate, some 16 more naval aircraft will have landed wheels-up during the remainder of 1956, for an additional loss of $2,560,000. Expressed in another way, this loss represents the equivalent of an entire squadron of jet fighters, or several squadrons of conventional attack aircraft.

The instrument you see pictured here perhaps best illustrates the

constant problem confronting pilots and associated personnel. Pilots will quickly recognize the instrument to be a landing gear position indicator. Until they read this sentence, some pilots will *not* have noted that the instrument indicates an unsafe landing condition as the wheels are UP. Such an oversight, in the landing traffic pattern, would result in aircraft damage, probably; in personnel injury, possibly, and in expense and embarrassment, certainly.

There is a saying among aviators that there are two kinds of pilots: those who *have* landed wheels-up, and those who are *going* to land wheels-up. This philosophy, the pilots will quickly add, they do not accept nor endorse—an unintentional wheels-up is still a "goof" any way you look at it. There exist ways and means of reducing the wheels-up rate, and the growing concern of air operations planners has greatly accelerated the production of improved equipment and techniques to reduce the accident rate even further.

This special report is intended to provide answers to the questions of "How do wheels-up landings occur?" and "What can be done to prevent them?" You may judge for yourself from on-the-spot reports of typical accidents, from person-to-person statements from pilots, and from a review of the recommendations, procedures and equipment available, whether the answers are adequate to the problem.

But first, a word from our sponsor, the Chief of Naval Operations, on the gravity of the subject:

"While the all-Navy major aircraft accident rate has been reduced substantially in the past two years, the number of involuntary wheels-up landings has increased . . . The rising cost of naval aircraft and the increasing number of back injuries sustained in unintentional

Please turn page

". . . the most insidious, exasperating cause of wheels-up landing—complacency . . ."

". . . the pilot did not realize that the gear was up . . ."

SEE IT NOW

Continued

wheels-up landings make this a problem requiring immediate command attention . . . "(OpNav Instruction 3750.7A)

Now, let's move out to the runways of several air stations, and watch what goes on . . .

Up there, over the field, is a three-plane echelon of F9F-8s coming in for the break. Now watch the number 2 man. The pilot is a jaygee, well-trained, with over a hundred hours in the *Cougar*. He's in excellent physical condition, the plane is functioning perfectly, and this is the 13th flight in 13 days—all just about alike. He would probably tell you he's got this one "locked."

There he goes, turning downwind — notice anything missing? Look for the wheels. Now watch the signalman at the end of the runway as he waves his flags in frantic desperation. Still no wheels showing. There he goes past the "WHEELS" sign, touching down in a belly slide that carries about 5500 feet down the runway.

Following the crash truck out to where the pilot is climbing out of the cockpit, only a look inside is needed to confirm that the landing gear lever is in the full UP position.

This is where the questions begin. "Why?" "What was the reason for this one?" For this particular accident there is every reason to believe that it resulted from the most insidious, exasperating cause of wheels-up landings—complacency. The pilot had flown this same sort of hop with such routine regularity that his normal concern for completing his landing check-off was lulled into a dangerous assumption that *this* landing was just like all the rest . . .

Across the country, at another air station, we found another pilot, flying another model aircraft, who also came to grief, but for another reason. As his flight entered the traffic pattern after a night flight, this pilot broke behind two others, cut back his power, dropped speedbrakes and slowed to 140 knots. At the 180 position he called "Everything down," *without having dropped his wheels or flaps*, and continued his approach — but let him tell the rest of the story:

"I looked at the gear windows, and I believe I mistook the 'U' in UP for the base of the indicator tires. I had a feeling that something was wrong . . . should have checked everything again, but it didn't sink home. By the time the wheel watch saw that the gear was up, it was too late to fire a flare.

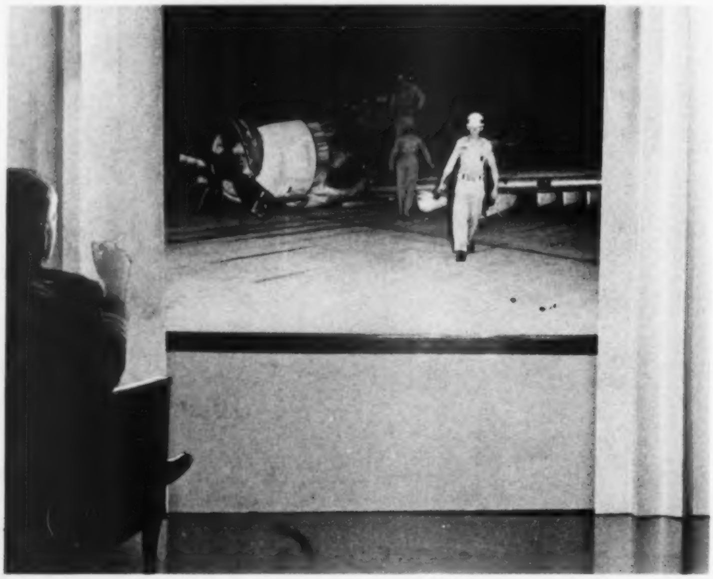
"I landed and my first indication of something wrong was when my nose fell through more than usual . . ." Even at this point, the pilot did not realize that the gear was up on landing, but assumed that his nose wheel had collapsed.

Again, the question arises: "Why?" And again, the answer is not a simple one. The pilot was considered an excellent one, with 900 total hours and 110 hours in model; he had displayed no tendency toward the lax and careless category usually associated with a wheels-up accident. He had 13 hours sleep the night before, but had had no breakfast, had taken only a milk shake for lunch and a hot dog for supper.

One recommendation made by the board, not unusual to this type of investigation, was to put the approach light switch in the "test" position for shore based flying. In this position the light is illuminated when the gear is down. . .

Because much has been said of the significance of established habit pattern and the effects of interruption of those patterns, it appeared that an impressive example was in

"... much has been said of the significance of established habit pattern, and the effects of interruption of those patterns . . ."



order. There was no difficulty in finding such an example.

This is the pilot of an F9F-8 on a night familiarization and landing practice flight. He has completed local area airwork and has been cleared into the pattern for touch-and-go landings. Further cleared to break and to call turning base leg, he began his first pass. . .

The first pass:

While lowering the landing gear on the downwind leg, the pilot noticed the red unsafe light in the gear handle was not functioning and he mentally cautioned himself to make doubly sure the gear was safe.

After calling at the 180 that his gear was "down-and-locked" he commenced his approach. It was an overshoot and he took his own waveoff, leaving gear and flaps DOWN.

The second pass:

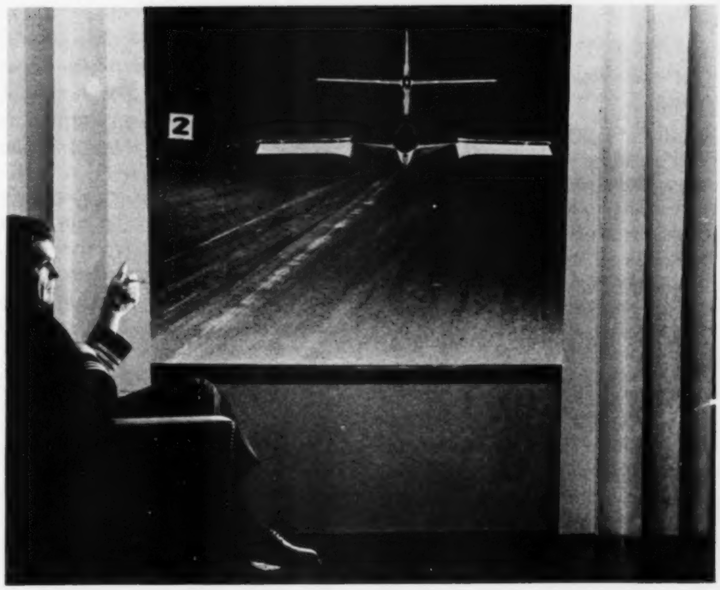
On downwind the tower cleared the *Cougar* to follow one *Banshee*. At the 180 spot once more, the pilot called and the tower requested he take it around as the *Banshee* was a full stop landing. He took a waveoff and proceeded to the break again, this time with gear and flaps up.

The third pass:

Due to a misunderstanding by the wheels watch, a flare was fired at the *Banshee* which took a waveoff. Once again the F9F-8 was cleared to break and follow the *Banshee*. When calling "turning base, gear-down-and-locked," the tower requested the F9F-8 to go around again for the *Banshee's* full stop landing.

The fourth pass:

The F9F-8 pilot requested clearance downwind and was told to follow another *Banshee* which had just entered the pattern. At the 180 spot the same thing happened; the tower requested the F9F-8 to take it around because the second *Banshee* was a full stop landing. Another waveoff.



". . . after the break the lead pilot extended his dive brakes instead of landing gear . . ."

The fifth (and final) pass:

The F9F-8 pilot received clearance from the tower to enter downwind and he commenced his approach. He called at the 180 and reported "gear-down-and-locked." Cleared touch-and-go, the pilot passed over the end of the runway about 30 feet off the ground at about 130 knots. The runway duty watch saw that the landing gear was not down and fired a flare which was not seen by the pilot. A warning by the tower was heard but it was too late and the plane touched down, wheels up and flaps down. The pilot thought the nosewheel had collapsed until he viewed the plane from outside the cockpit.

Looking further into this matter of habit interference, additional comments were obtained from another accident which occurred at night.

The flight was a two-plane night familiarization hop since it was the first night flight for the lead pilot since joining the AD squadron and also his first night hop in four months.

Night section tactics were performed in the local area and the flight returned for a landing. After being cleared to the break the section was told to depart the pattern and re-enter, due to other traffic. Re-entry was normal and the flight was cleared to break and to "Check base with gear."

After the break the lead pilot extended his divebrakes instead of the landing gear.

The tower requested, "Recheck gear, cleared to land," and the pilot replied "gear down, pressure up." Once more the tower said,

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SEE IT NOW

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"recheck your gear, cleared to land."

On final approach the pilot reported and the tower came back with, "aircraft on final recheck gear, clear to land, winds northwest four." Seconds later, after a shower of sparks on the runway, the tower broadcast, "all aircraft in the vicinity of . . . airfield, there has been a crash on the runway, continue orbiting. . ."

In the ensuing investigation it was brought out that the pilot had flown about 115 hours in the preceding year; 65 hours were in the SNB. Half of that time was in the right-hand seat. The accident board considered this to be one of the factors behind the pilot's use of the divebrake handle instead of the gear handle. "Recent flights in the SNB exposed the pilot to lowering the landing gear with a motion to a cockpit location which is similar to that required to lower the divebrakes in the AD aircraft."

Preoccupation, it has been established, accounts for a number of wheels-up troubles, and a typical example was found in the situation of a AD4N pilot. On his third fam flight in the aircraft, the pilot broke from the slot and actuated the landing gear lever, but failed to place it in the full down position. Although the tailwheel came down, there was insufficient pressure to lower the main gear.

The tower had cautioned the AD about an SNB making a GCA approach to another runway—and the AD pilot, occupied with looking for the other airplane, did not check his gear down and locked.

The tower then acknowledged the pilot's report of "turning base, gear-down-and-locked," and cleared him to land. There was no runway watch on station, and the touchdown, on the belly, was followed by a 200-yard slideout. Although the runway crash truck was radio-equipped, the gear had been turned OFF and did not warm up in time to permit a warning being made.

Said the pilot: "When I realized that a wheels-up landing was in the process, I was very surprised . . . My next mental reaction was one of anger at myself for failure to have double-checked the landing gear control and indicator."

Finally, we inquired concerning the facts leading up to a wheels-up accident which was particularly interesting for both the lack of and the presence of numerous cause factors.

Completing a tactics hop, a pair of F9F-6s flew home and entered the traffic pattern, whereupon the leader broke and lowered his gear on the downwind. The wingman followed and turned downwind.

At the 180 point, the leader reported "turning base, gear-down-and-locked" and was cleared to land. The wingman reached the 180 a few seconds later, lowered flaps and reported "turning base, with wheels-down-and-locked." He had not actuated the gear lever, and wheels were still snugly positioned within the wheelwells.

The second pilot was cleared to land and made a normal approach. Crossing the end of the runway he closed the throttle and touched down, sliding some 3000 feet to a stop.

It was established that the runway duty officer was standing the watch in the tower at the time of the accident because a satisfactory portable radio was unavailable. The duty officer notified the tower operator of the situation but there was insufficient time to issue a warning. The runway wheel watch noticed the gear was up as the plane approached and he waved his paddles, but the waveoff was not perceived by the pilot. Apparently the

". . . preoccupation accounts for a number of wheels-up troubles . . ."

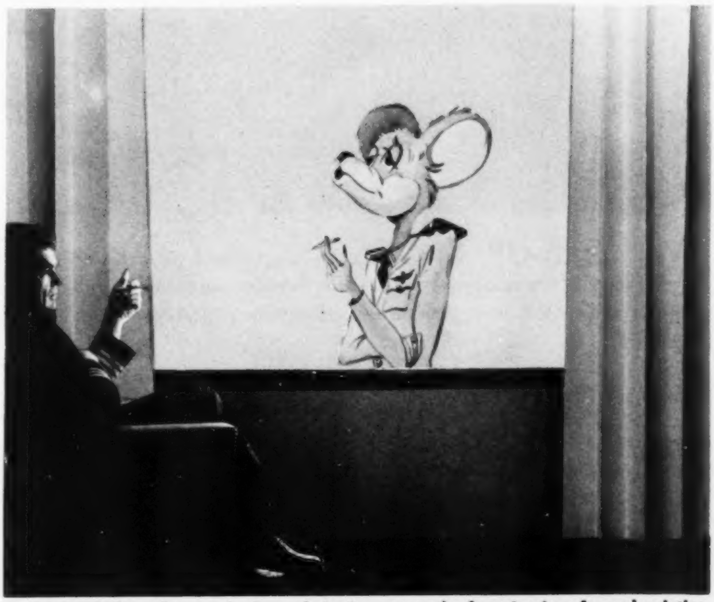
runway watch was not equipped with flares.

To the inevitable "Why?" there are submitted these points:

The pilot had been on duty for the past eight hours and had had nothing to eat for eight and one-half hours. The base was located in a hot, dry area. To this, the pilot adds:

"This was the sixth plane I had been in and out of. Two others were flyable. Three I had strapped myself into, started up and checked out, shut down, unstrapped and disconnected from, clambered out of and downed . . . I would recommend to anyone in the same fix that he give up and take a shower instead of trying again."

ANYMOUSE



"For comment from the man in the cockpit, Anymouse, the famed voice of naval aviation was interviewed in his duplex apartment located beneath the tetahedron . . ."

Not all wheels-up approaches are carried through to a landing. Frequently the pilot is warned and is able to take a waveoff before touching down. Some of these more-fortunate pilots confide their relief and embarrassment to a unique aviation personality—ANYMOUSE. To Anymouse, that famed friend of the flier, who helps the pilots to help themselves by providing an informal exchange of personal experiences, this problem of wheels-up prevention was presented. As might be expected, Anymouse was loaded with information. . .

"Well, Mr. Thorow, I get a lot more reports from pilots than just near-wheels-up landings, but I do have quite a few interesting hairy tales on the subject. Try these out for effect, and as you can see from these examples, the only specific statement you can make about a wheels-up approach is that there is no particular item which is apt to cause it. It's like trying to pick out the most dangerous cat in a whole roomful of the nasty creatures!"

WHEELS!

"I was on a night fam hop in the S2F shooting touch-and-go's at home field. After about 10 touch-and-go's, the copilot (instructor) gave a simulated single engine on the starboard side.

"All went well. After one more normal approach a simulated single engine was given on the port engine—this time just about halfway down the runway on the downwind leg. Things were pretty rushed in trying to get set up by the 180 position. Needless to say, in that rush, one important item in the checkoff list was overlooked by both the pilot and the copilot. We both missed checking the gear.

"Upon reaching the 180 spot, the copilot called "gear down and locked." We proceeded with the approach, a little high and fast enough to assure plenty of control with no flaps.

"An alert wheels watch saved us both the embarrassment and a subsequent pilot's disposition board by giving a timely waveoff. I strongly recommend that all pilots be doubly cautious in their pre-landing checkoff lists when undergoing simulated or actual emergency procedures."

WHO? ME!

"We were headed for home from an Air Force base after a pretty hectic weekend involving an Armed Forces Day. We'd spent two late nights and two long days standing around explaining where the hook was and what the in-flight refueling probe was.

"I was beat and was really looking forward to a cool one and hitting the pad. Now we practically had it made if I hadn't tried to land about 20 feet high back home.

"Then Ed called and wanted me to check his gear which indicated an unsafe position. He assumed the lead, and shortly after getting as-

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surance that the gear was all right he called for both of us to enter home base traffic pattern.

"Then the questions started: 'What is your point of departure? Is the flight plan filed in the number of 177? Is 365 on the same flight plan?' Routine questions when you beat your flight plan home.

"As Ed had already broken by this time, I dug out the DD175 on my break and read off all the dope while killing my airspeed. That done, I went over the checkoff list: gear O.K., flaps down, shoulder harness locked—and reported 'all down' when turning base.

"It would be pretty tough to fly a prettier approach—smooth turn, smooth rate of descent, airspeed right down to the knot, less power than usual (being light in this smooth air really makes a difference). You talk about complacency. This *was* a nice pass. Almost ready to flare out, and BAM! Red Flares! What the heck. Two-block it and wait to see what's the matter. Gear up? Nope, it's still down all right.

" 'One seven seven, the reason for the waveoff is your gear still appears to be up.'

"By golly, it was!

"And then it hit me. The Doc's statement ran through my mind in an instant. I always drop the gear just after rolling out on downwind if my speed is all right. But this time I was trying to satisfy the tower with their questions. When turning on base leg I wanted to see my gear indicating; so I did.

"But what shakes me up is that I read the indicators as being down even after the waveoff. Thanks to the crash crew the only result was a feeling of stupidity and the cost of a case of beer."

"WHEELS-UP SAVES by alert watch and tower personnel, long a profitable means of such accident prevention, are now appropriately cited in a program of recognition in *Approach*."

LT W. E. Jennings, LT A. R. Kreutz, Chandler, M. M., AN

NAS BIRMINGHAM, 21 and 22 July 1956

One AD each day on consecutive days was saved from making a wheels-up landing by Lt. **Jennings** and Lt. **Kreutz**, Runway Control Officers, and **Chandler**, the Runway Wheel Watch.

The pilot of the first incident was forced to make two initial passes before being cleared to break. On base, he reported gear "down and locked," but only the flaps were extended. His waveoff was given by use of radio and paddles.

The next day, another pilot was making touch-and-go landings and extended the gear on the downwind leg. At the 180-degree position, he reported gear down, and then pulled *up* the gear handle. His waveoff was given by use of 2 flares from a Very's pistol, paddles and radio. Pilot-reported flares were the most effective means of warning, with radio next most effective.

1st LT R. D. Wootten; PFC L. R. Karstedt

MCAS Cherry Point, 19 October 1956

At the 180 degree position, the pilot of an F3D called for landing clearance, stating "gear-down-and-locked". He continued his approach, and at the 90 degree position, 1st LT **Wootten** spotted him and observed that the landing gear was not extended. While LT **Wootten** called the pilot on the Runway Watch Officer's portable radio, Pfc **Karstedt** fired flares. The plane took a waveoff, went out and re-entered the pattern to make his next pass with the wheels down!

Swanson, S. L., SA

VR-32, 23 August 1956

The pilot of an AD made his approach for landing on the mat at NAS North Island with the landing gear retracted. **Swanson**, the runway wheels watch, alerted the pilot to the improper approach by signaling with flares and signal lights. The warning was observed and the wheels-up landing averted.

CDR. G. R. Foerester, LCDR D. R. Hester

NAS NEW ORLEANS, 23 July 1956

Using flares to give a waveoff to the pilot of an AD-4NA, Cdr. **Foerester** and Lcdr. **Hester** prevented a wheels-up landing at New Orleans Municipal Airport.

Poor, C. D., AA

NAS Moffett Field, 15 October 1956

A VA-214 pilot of an F9F-8 made a wheels-up approach for landing. **Poor**, the runway wheels watch, waved the aircraft off and averted the accident. The commanding officer of VA-214 presented **Poor** with the squadron insignia patch and decal, and the following citation: "In recognition of the dollars which your action saved the Navy and the taxpayers of the nation, the maintenance and administrative hours which it saved this squadron, and the personal mortification which it saved an anonymous pilot, VA-214 desires to extend to you honorary membership in the squadron . . . the right to wear the squadron insignia and the privilege of attending squadron "all hands parties."

2nd LT G. L. Ellis

VMF-114, 14 November 1956

A six-plane formation of ADs broke for landing at MCAS Cherry Point. As the lead plane reached a 45-degree position, 2nd LT **Ellis**, the runway duty officer, saw the AD had its landing gear retracted. He called the pilot over the radio and fired the flare pistols, ordering the waveoff which prevented the wheels-up landing.

Sand, D. W., AN

VR-873, 28 October 1956

The pilot of an SNJ reported turning base leg to the NAS Oakland tower and was cleared to land. As the aircraft passed the 90-degree position, the runway wheel watch observed through binoculars that the wheels were not extended. Using LSO type flags, **Sand** gave the pilot a waveoff and prevented a wheels-up landing.

Rivera, D. S., AN

OLF Brewton, NAAS Whiting Field, 18 October 1956

Rivera was driving a weapons carrier onto OLF Brewton when he saw a T-34 at the 90-degree approach position, landing gear up. **Rivera** raced the weapons carrier the last 200 yards to the runway, but with insufficient time to load the flare guns, he grabbed the white hat from the other member of the crash crew seated beside him, leaped from the vehicle and ran to the center of the runway in front of the approaching aircraft. With his own white hat in one hand, and the "borrowed" one in the other, he frantically gave the aircraft a waveoff at an altitude of approximately 200 feet.

Rivera is credited with 12 previous saves in the preceding 18 months.

1st LT W. R. Wyatt

ATU-213, 26 October 1956

1st LT **Wyatt**, flying a TV-2 in the traffic pattern of NAAS Chase Field, heard the student pilot of the TV-2 ahead of him in the pattern call the tower "Turning base leg, gear-down-and-locked." LT **Wyatt** observed that the wheels were not down, advised the offending pilot of this fact, and finally ordered him to take the waveoff which averted a wheels-up landing.

Continued next page

". . . amid the wilderness, one conclusion remains unaltered."

"Pilot-caused wheels-up landings have been occurring for the past 20 years. After each one the commands concerned have stated that the problem of proper pilot indoctrination will be given increased emphasis." Written by the commander of a fighter squadron, that statement is substantial enough to provide the opening sentence of any discussion of wheels-up landings. The question is, in what direction do we go from here?

Expressions of opinions regarding the wheels-up problem are many, varied and often contradictory. Some of these views are unsupported by factual data and hence must be qualified as such. But, in each of the following remarks there is evident a general concern over the gravity of the wheels-up situation.

In one direction there is this answer written by the skipper of an air station who had the unpleasant task of forwarding a wheels-up accident report. "The lack of a visual or aural warning signal, other than the gear indicator, to indicate a gear-up condition in jet type aircraft, is considered to be a hazard to the operation of such aircraft.

"Training and conditioning of the pilot to execute all functions of the aircraft preparatory to landing, have been explored and expanded to a degree that there appears to be nothing more which can be done to eliminate wheels-up landings from the standpoint of the pilot.

"Therefore, additional improved human engineering aids seem to be the only solution. The pilots or group of pilots who usually make wheels-up landings are those of many years of pilot experience, *and the wheels-up landing occurs for no apparent reason in many cases.*"

A squadron skipper had this to say in forwarding a wheels-up accident report: "With increased aircraft cost and continuing wheels-up situations, runway duty watches have become practically indispensable. In most cases, however, the physical set-up for them to perform their duties is primitive.

. . . The cost of this single accident, while minimal, would underwrite installation of a satisfactory system for warning aircraft . . ."

From an Air Task Group Commander: "Although there will be times when a squadron will be burdened by having to furnish an officer runway watch, it is believed to be one of the most readily available means of helping prevent wheels-up landings.

"Had there been an officer on duty as runway safety watch, he would have not accepted the responsibility of the watch knowing that a Very's pistol, a vital piece of his equipment, was missing. Had this equipment been available and used it may have prevented this accident."

Another point is brought out by this CO of a major air station in his endorsement of a wheels-up landing report: "The problems associated with the elimination of wheels-up landings are many and

varied and well known to all aviators. With each recurrence of such landings, new solutions and procedures are proposed, each with its own merits.

It is felt, however, that the various systems now in use throughout the Navy lose a considerable part of their effectiveness by the very fact that there is no standardization. A pilot operating from one field becomes accustomed to observing a paddles indication for a safe or unsafe landing condition. At another field he may experience a large 'wheels' sign at the runway edge, or a series of red flares, or a flashing light, or a radio transmission, or any number of similar systems or combinations of systems.

Reactions are slowed when confronted with something unfamiliar or unexpected and it is believed that many wheels-up landings could be averted if the Navy were to adopt a standardized system based on an evaluation of the many procedures now in use."

A different road to the "wheels-down" solution is recommended by this group. "The (accident) board believes that wheels-up approaches and landings will never be eliminated from fighter type aircraft as long as the item—landing gear—is sandwiched among as many other items on the landing checkoff list as it is today. The speed and characteristics of present day aircraft do not allow the pilot enough time from break-up to touchdown to read and check the numerous items which now make up this 'landing checkoff list.'

"This is especially so in a formation break-up, for then the problems of interval, jet (prop) wash, runway traffic, . . . are added. In view of this, the board recommends . . . that only those items which must actually be accomplished in the landing pattern (landing gear, flaps) be separated from others that should rightfully be accomplished prior to break-up, and placed in a conspicuous point in the cockpit, such as in the middle of the instrument panel, near eye level, or adjacent to the airspeed indicator."

Finally, a high ranking naval aviator's endorsement on the subject highlights the one basic requirement which any wheels-up prevention device must have. "In order to prevent . . . routine 'wheels reports' following only a casual glance at indicators, equipment must be provided that will force a pilot to *concentrate*, at least momentarily, on the wheels indicators."

Among other solutions, the simple expedient of fixing numbers on each of the three individual wheel "barber pole" indicators has been suggested. It is reasoned that requiring the pilot to report these numbers in his wheels report to the tower will force a pilot to *concentrate* on the wheels indicator as long as the numbers are changed at frequent intervals.

The Safety Center is having a modification of this idea prototyped. This will provide a "counter," in some respects similar to the wheels of a one-armed bandit slot machine which presents a random series of numbers for each gear actuation.

An extensive study of this subject by the Naval Aviation Safety Center regards the problem as one wherein the pilot, regardless of his experience and abilities, under the proper circumstances, undoubtedly would become a victim of a wheels-up landing accident. Believing the problem to be essentially one of training, the study provides, among other things, additional support for the "circle safe" device developed by the Office of Naval Research. (See *Approach*, "Headmouse", August 1956). As further information becomes available, it will be published in *Approach*.

In the face of this challenge the Bureau of Aeronautics has not been idle. A five-point program to reduce the number of wheels-up landings is being put into operation throughout Naval Aviation shore stations. The core of this program will be runway wheel watches equipped with mobile radio control equipment plus a remotely controlled multiple flare system. Much of this mobile radio equipment is scheduled to be in use in early 1957.

And so, amid the wilderness of checkoff lists, runway wheels signs, flares, Aldis lamps, runway watches, warning horns, runway duty officers, tower challenges, runway portables, numbered wheel indicators, flashing unsafe lights, and GUMP checks, one conclusion remains unaltered. The individual pilot must, at least for the present, rely on a shrewd application of his training and experience in each landing situation. The final responsibility for avoiding wheels-up landings rests with the pilot himself ●

FLYING THE *Fury*

by
Richard M. Wenzell
Chief Engineer Test Pilot
Columbus Division
North American Aviation, Inc.

THE FJ-4 is an outgrowth of the FJ-3 day fighter, but is an almost entirely new machine except for the power plant.

The major changes are very thin wing and tail surfaces, increased wing area, and greatly increased fuel capacity. With its low drag surfaces, level and diving speeds have been considerably increased over its predecessor.

An internal fuel capacity equivalent to the FJ-3 with two 200 auxiliary tanks combined with the excellent specifics of the J-65 engine give the FJ-4 very long legs. External fuel tanks and inflight refueling provisions can be used to further extend the range.

Tremendous engineering design efforts have been expended on the FJ-4 and a continuous stream of development flights have followed the first flight in October, 1954, to provide a sturdy, capable, comfortable, and easy handling airplane. During the engineering development flight tests and the structural, aerodynamic, and systems demonstrations performed for the Navy, we have learned (and are still learning) many things about the FJ-4.

The cockpit is roomy and comfortable. With the canopy closed, adjust the seat height so that you can place your hand flat between the top of the canopy and your helmet, with your helmet against the headrest. This insures that you have adequate clearance between the canopy bow and your helmet if it is necessary to jettison the canopy in an

Four

emergency.

The airplane is much easier to maneuver on the ground because of the wider landing gear and less weight on the nose gear than the FJ-3.

Recommended comfortable (not minimum) takeoff speeds using full flaps are 125 KIAS for the clean airplane and 135 KIAS with two full 200-gallon auxiliary fuel tanks. During the takeoff roll, the nosewheel will start to bounce at about 85 KIAS. Raise the nose slightly so that the nosewheel will be approximately one foot above the runway and maintain this altitude until approximately 5 KIAS below the recommended lift-off speed, then slowly ease the nose up as the airpalne continues to accelerate and fly it off smoothly.

If this procedure is followed, excessive takeoff distance and stalled takeoff problems are eliminated.

New Location for Emergency Switches

Guarded fuel system selector and emergency ignition switches actuated laterally are located just aft and inboard of the throttle quadrant on the left console. In case of a takeoff primary fuel system failure, these switches can be actuated with a minimum of motion and lost time.

A reliable and positive canopy jettison system is provided and the comfort and efficiency gained with the canopy closed outweighs the remote possibility of a double failure (crash landing and malfunction of the canopy jettison

Please turn page

FLYING THE *Fury Four*

Continued

system).

However, takeoff and landings with the canopy open are preferred by some and reasonably low intensity airstream buffet is encountered below 140 KIAS.

Take off with all defrost switches OFF so that an unbearably hot blast in the face does not distract you from normal duties. In the early part of the climb at or near military power, select windshield defrosting to a tolerable flow and then maintain this setting for the remainder of the flight. This preventive setting will provide windshield and canopy defrosting under most conditions at high altitudes and during letdowns except on extremely hot-humid days.

The FJ-4 has excellent maneuvering characteristics at combat gross weights due to the relatively low wing-loading, the cambered airfoil section, washed out wingtips and stall fences.

Because of these features, the buffet boundary is high and accelerated stalls are characterized by an increase in airframe buffet intensity as the stall is approached and a mild porpoise with no marked tendency to roll-off or yaw if stall. Recovery is easily effected by easing the stick toward neutral. Considerable maneuvering ability exists at combat ceiling.

In the low attitude, high-speed range, longitudinal control is very sensitive. For this reason tight formations in this speed-altitude region requires thorough familiarity with the response characteristics of the Four.

Avoid Overcontrol During Fam

All longitudinal and lateral control forces are light and the airplane feels and responds like the capable fighter it is.

At low altitude, with high indicated airspeeds, a marked increase in stabilizer effec-

FJ-4 comes aboard the FORRESTAL—Although a reliable and positive canopy jettison system is provided, those who prefer takeoff and landing with the canopy open will note only moderate airstream buffet encountered below 140 knots IAS.

Dick Wenzell joined North American as engineering test pilot late in 1953, and has been closely associated with the *Fury Four* ever since. From 1942 until 1953 Dick operated off carriers during WW II on North Atlantic subhunts, and again in Korea where he logged 75 jet missions as Ops Officer of VF-51. He is a graduate of the first test pilot training class at NATC, Pax River. He later served as project officer in the carrier and VF tactical test divisions.

tiveness is encountered which increases longitudinal control sensitivity.

Although this is not an alarming feature and precise control without overcontrol can be attained with a little experience, do not attempt to fly tight formation in this speed-altitude region until familiar with the response characteristics of the airplane because a pilot-induced oscillation can result. If a divergent oscillation is inadvertently induced, release the stick and an immediate recovery will result.

Do not attempt to damp the oscillation by stick movements because your reaction time will probably phase your stick movements such that they reinforce and aggravate rather than damp the oscillation.

A mach-sensing stability augmenter is provided as a part of the longitudinal control system to eliminate a mild transonic tuck-under.

The augmenter reduces the pilot effort necessary to maintain level flight and is particularly beneficial on long-range flights.

The transition to supersonic speed is uneventful and lateral and longitudinal control effectiveness are good. The maximum mach numbers of which the airplane is capable are, of course, attained in military power, vertical dives from service ceiling.

However, before you attempt a maneuver like this, become thoroughly familiar with the speed-dive angle-recovery altitude characteristics in buildup dives.

Stall, Warnings, Recovery

Unaccelerated stalls in the landing condition are characterized by stall warning (rudder pedal shaker) approximately 15 knots above the minimum speed, a mild left or right yaw easily controllable with rudder 10 knots above the minimum speed, mild lateral wobble and airframe buffet just above the minimum speed, and a mild nosedown pitch at the mini-

Please turn page

mum speed. Lateral and directional control can be maintained with the stick at the aft stop while the airplane progresses through 2 or 3 longitudinal oscillations.

Recovery from a stall with least altitude loss should be effected by simultaneous application of military power and nosing over to increase speed, then completing the recovery by pulling out into level flight just on the edge of light stall buffet.

The airplane exhibits very good landing characteristics. However, like any modern high performance airplane, airspeed and sink rate must be kept under positive control for consistently safe landings.

Use engine thrust to regulate sink rate and pitch attitude to control airspeed.

Approach Technique

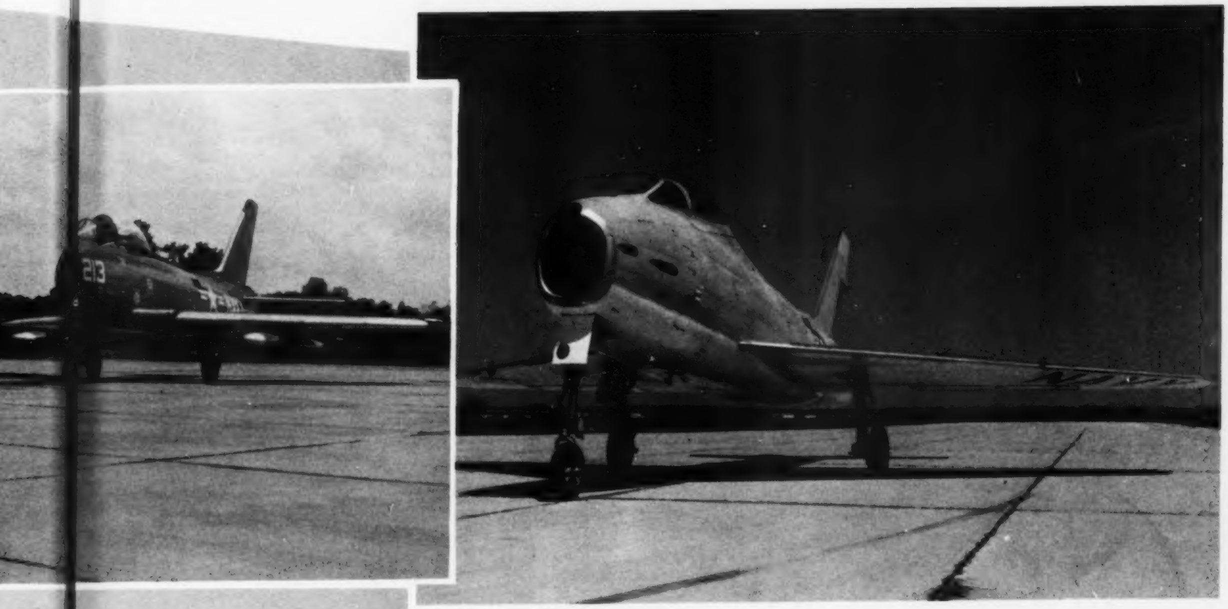
Be particularly alert to prevent excessive sink rates during descending landing approaches normally used when shore-based. Use the angle of attack indicator as a cross check of stall and approach speed variations with airplane gross weight.

Don't make tight approaches and if the runway is overshot due to crosswind or other factors, keep from boxing yourself into a tight corner by taking it around.

In a normal descending approach, it is desirable to maintain 135 KIAS downwind, 130 KIAS crosswind, 125 KIAS over the fence and 115 KIAS at touchdown at normal landing gross weights; 125 KIAS is optimum for mirror or constant altitude carrier approaches.

Make power-on landings until reasonably familiar with some of the landing variables, i.e., thrust decay, ground effect, gross weight, trim changes due to thrust, longitudinal control effectiveness . . .

After touchdown on the main gear, maintain this attitude and as speed decreases, raise the nose slowly (do not rotate abruptly or the airplane may become airborne again) to the horizon. This



Comparison of *Fury* "four-runners," FJ-1, -2, and -3 (left to right), reveals family lineage from which FJ-4 was developed.

attitude provides good aerodynamic braking. Maintain directional control with the rudder as the airplane goes through a complete ground stall. When stabilizer effectiveness decays markedly (about 90 KIAS), ease the nosewheel to the runway with the remaining stabilizer available. Let the airplane roll while still maintaining directional control with the rudder.

More Rollout Tips

When 3000 - 2500 feet of runway remains, retract the flaps and smoothly apply light intermittent and simultaneous brake pedal forces so the airplane is slowed to taxi speed at the end of the runway.

If, because of adverse conditions, braking must be initiated at speeds above 100 knots, cautiously apply light intermittent brake pedal forces until below this speed, then increase braking forces. Heavy brake applications at very high ground speeds lead to brake fade/blown tires (due to skids or overheating).

We have landed *Furies* without blowing tires at speeds up to 160 KIAS on 8000-foot runways and at 180 KIAS on a 10,000-foot runway by applying the foreging general braking rules.

Landings in 90-degree, 30-knot crosswinds have been executed with relative ease, crabbing to correct for drift. The wingdown method may result in damage to a wingtip in a severe crosswind.

Immediately after touchdown, lower the nosewheel to the runway and retract the flaps. Maintain directional control with the rudder and ailerons until effectiveness is lost. Then and only then, use light intermittent brake applications to maintain direction and to decelerate the airplane to taxi speed.

This article is not intended to be a complete guide to the flying qualities and operational procedures of the new *Fury*, but it will serve to acquaint the reader with some of its characteristics. ●

HEADMOUSE

Dear Headmouse:

Your "Knee Pad Notes" (October *Approach*) set me thinking: Why not print a tear-out type sheet—*knee board size*—when you have dope a pilot should carry?

It could be printed on heavier paper or a regular page could be perforated.

Possible fields for consideration are: standard checkoff lists and emergency procedure, cruise control charts . . . (for each model aircraft) but primarily dope for all pilots all the time.

JACK W. HARRIS
Capt. USMC

It is believed that authorities would be hesitant to buy this tear-out idea because the next user of the book would not have the data. However, we will forward the suggestion for consideration that nonconfidential handbook charts be made the correct size for photographing for knee pad use.

Very resp'y,
Headmouse

Dear Headmouse:

The November '56 *Approach* contains a note which states that an individual first aid kit (Armed Services Medical Stock List Stock No. 6545-919-7675) is available for issue to all pilots. The medical department at this station states that this kit will be issued only in forward areas as it contains morphine. The Medical Committee of the ComAirPac Consolidated Aviation Safety Council in their October 5, 1956 meeting concluded that this kit was not desirable and favored the Survival Kit, Personal, (PSK-2, Part I and Part II, Stock No. R-83-K-709996).

Would appreciate any light you can throw on the subject.

This unit operates a survival school for the pilots and aircrewmen of the Fleet Air Alameda area. Much of the good dope in your survival articles and Aero-Medical section has been incorporated in the school syllabus.

Thanks!

T.W. McELRATH, LTJG
Survival Officer
FAETUPac Det ONE
NAS Alameda, Calif.

The information on first aid kits in the November issue was furnished to the Naval Aviation Safety Center by Bureau of Medicine and Surgery. In a letter to BuMed, NASC expressed concern over the increasing possibility of an injured pilot landing in uninhabited areas at a considerable distance from his aircraft. Many hours or days may elapse before the pilot is finally located and rescued. This would indicate a need for a minimum first aid kit for self-treatment. It was further recommended that this kit contain morphine to relieve the extreme pain associated with burns and fractures which are among the most commonly encountered injuries in aircraft accidents.

BuMed advised the NASC that "there is available at this time for issue to pilots on an individual basis a First Aid Kit, Aviators, Camouflage, Armed Services Medical Stock List No. 6545-919-7675. This kit contains a ¼ gr. morphine syrette together with other necessary first aid equipment. Authority to place morphine in any presently issued first aid kit is contained in the Manual of the Medical Dept., Ch. 3, para. 3–34(2). Security of narcotics so issued must be in accordance with the Manual of the Medical Dept., Ch. 3, para. 3-35." The manner and degree of security in first aid boxes must be consistent with the circumstances of use and operating conditions.

Every precaution must be taken to prevent narcotics from falling into the hands of irresponsible individuals. But the benefits expected must be considered as well as the security required.

The frequency of aircraft accidents and the associated injuries in present day aircraft places many of our pilots in a category comparable with the front lines of a forward area. No one is interested in depriving men so exposed of the life saving benefits of such a valuable drug as morphine.

Very resp'y
Headmouse

Dear Headmouse:

Please advise us on the following: (a) What is the recommended policy concerning wearing the Z-2 antiblackout suit in high performance aircraft during routine utility flights? (b) What is the advantage or disadvantage of wearing the summer flight suit over the G-suit for added fire protection? (c) If there is an advantage in wearing the summer suit, can the full suit be altered by removing the top half? (d) If the cutaway suit is okay, should it be outside or inside the summer suit?

ANYMOUSE

Our advice is to wear the suit in all aircraft where it can be used. High G-forces can be expected even on non-tactical flights, from thunderstorms, turbulence, and mechanical failures where high G-forces are not anticipated.

The disadvantage of wearing a summer flight suit over an anti-G suit is that it is hot during the summer. The advantage is that it will provide greater protection in the event of fire. It would be difficult to modify the coverall type anti-blackout suit by removing the top portion. The problem involves holding the inflatable bladders in proper position during flight. It would be advisable to check any modification with BuAer.

The Z-3 cutaway type anti-G suit is authorized. However, it should be recognized that it provides an average of only one-half the protection afforded by the coverall type suit. Either type suit should be worn as close to the body as possible, and in all cases beneath the summer flight suit.

Very resp'y,
Headmouse

Notes from your Flight Surgeon

LEARN OR BURN

Four *Cougars* were spotted side by side on the port side of a CVA with tails angled outboard about halfway down the canted deck. After turn-up the launch proceeded normally until the second F9F-8 was taxied out of his spot.

At this time the plane captain and other flight deck personnel were untying the number 4 aircraft. Number 2 in taxiing out did not make the full turn to a fore and aft position on the flight deck, due to taxiing difficulty.

As a result, the jet blast struck the personnel engaged in preparing number 4. Exposure to about 10 to 15 seconds of jet blast resulted in severe burns and hospitalization of three men.

The squadron commander recommended that the taxi out procedure be reversed with the jet spotted further aft brought out of the spot and up the deck first. Also it was recommended that plane directors insure that personnel have cleared the area prior to bringing a jet out of the spot where any jet blast may injure personnel.

F9F-8 BAILOUT

After two unsuccessful attempts to fire the ejection seat, the aviator made a successful bailout from his F9F-8 at 6000 feet. The well-trimmed plane glided to a relatively undamaged landing, and tests of the ejection seat showed it to be in working order. Apparently, the pilot had not pulled the face curtain far enough on either of his two attempts.

He also did not pull the manual release pin following the first nonfiring. This may be explained by the fact that at his last ejection seat indoctrination, *the training seat did not have the manual pin release mechanism.*

NEW EXCUSE

"Hey! Black eye! What's your excuse?"

"Well-ll. It happened this way. You heard about the AJ-1 that went in the water this morning? I was crewman. We were doing Carquals and came in too low. The tailhook caught the underside of the ramp and broke off, and we went right on down the whole length of the deck and off the other end into the water! That's when I got my black eye. The pilot didn't get hurt at all.

"I hit my face on the gunsight—*had one shoulder strap loose*, and my shoulder was bruised too. The doctor says I was lucky I wasn't knocked out so I couldn't get out of the plane.—As it was, we were both picked up in two minutes by the angel."

"Well! That's at least a new excuse for a shiner!"

WORRIES GROUNDED

A recent aircraft accident involved a pilot who was enmeshed in a great deal of family cares, sickness, and dispute.

The pilot carried his troubles into the air, devoting time that should have been employed for his own immediate welfare to these problems. By so doing he set himself up for the accident.

Leave your problems home. Worries of a personal nature must be "grounded." Your only problem when airborne is to get safely home again.

If problems become insurmountable, or seemingly so, see your flight surgeon.

OXYGEN?

CNAVanTra Flight Safety points out that: 1. The fact that you get *air* with your oxygen mask on only indicates that you are alive. It is no indication that your oxygen supply is ON. 2. The blinker *and* your pressure gage are your best checks.

If either one is not right—start looking around.

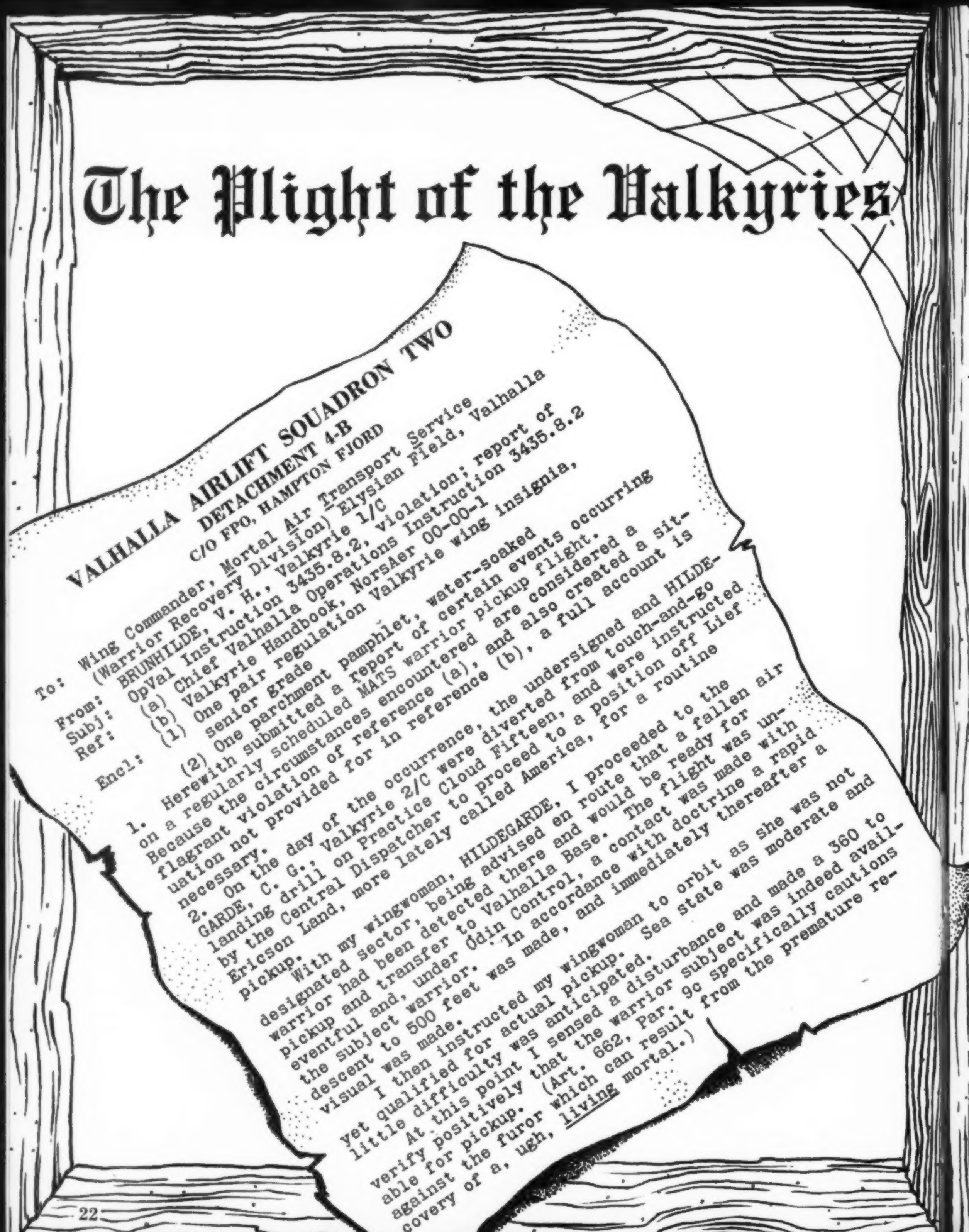
CRASH PLAN

In a crash fire the fundamental consideration is the saving of lives. Firefighting is directed toward this end but obviously, crash-fire-crews should be as well trained to work rapidly and competently inside the aircraft as they do outside.

At a transport or patrol plane crash scene they will have to remove many survivors on stretchers. The task is made all the more difficult by broken floors, seats torn out, fuselages either on their side or upside down.

Cornell University's aviation crash injury research department investigated four transport accidents and came up with these percentages: 64 percent of the people involved in the four accidents could not move themselves and were in need of assistance. Up to 44 percent were injured in their lower extremities and 42 had periods of unconsciousness lasting from a few hours to 17 days.

The Plight of the Valkyries



VALHALLA AIRLIFT SQUADRON TWO
DETACHMENT 4-B
C/O FPO, HAMPTON FJORD

To: Wing Commander, Mortal Air Transport Service (Warrior Recovery Division) Elysian Field, Valhalla
From: BRUNHILDE, V. H., Valkyrie 1/C
Subj: OpVal Instruction 3435.8.2, violation; report of
Ref: (a) Chief Valhalla Operations Instruction 3435.8.2
(b) Valkyrie Handbook, NorsAer 00-00-1
Encl: (1) One pair regulation Valkyrie wing insignia, senior grade
(2) One parchment pamphlet, water-soaked

1. Herewith submitted a report of certain events occurring on a regularly scheduled MATS warrior pickup flight. Because the circumstances encountered are considered a flagrant violation of reference (a), and also created a situation not provided for in reference (b), a full account is necessary.

2. On the day of the occurrence, the undersigned and HILDEGARDE, C. G., Valkyrie 2/C were diverted from touch-and-go landing drill on Practice Cloud Fifteen, and were instructed by the Central Dispatcher to proceed to a position off Lief Ericson Land, more lately called America, for a routine pickup.

With my wingwoman, HILDEGARDE, I proceeded to the designated sector, being advised en route that a fallen air warrior had been detected there and would be ready for pickup and transfer to Valhalla Base. The flight was uneventful and, under Ödin Control, a contact was made with the subject warrior. In accordance with doctrine a rapid descent to 500 feet was made, and immediately thereafter a visual was made.

I then instructed my wingwoman to orbit as she was not yet qualified for actual pickup. Sea state was moderate and little difficulty was anticipated.

At this point I sensed a disturbance and made a 360 to verify positively that the warrior subject was indeed available for pickup. (Art. 662, Par. 9c specifically cautions against the furor which can result from the premature recovery of a, ugh, living mortal.)


Valhalla Airlift Squadron 2
Detachment 4-B
c/o IPO
Hampton Fjord
To:
From:
Subject:
Ref:
Encl:
BUARMOR
I LOVE LIEF
LOKI'S SOOTHING SYRUP
OpVal Instructions
Approach

The subject floated partially submerged in the water, with no discernible movement. However, before I could make a low pass for a soul-check, a new disturbance, of considerably stronger force, was sensed. I immediately took a wave-off and pulled up, only to find myself on a collision course with a strange flying creature whose wings rotated above its body in a startling manner, and with a fearful roaring and flailing of the air. I instinctively attempted a split-S to clear, but as the terrible thing passed overhead I was assailed by such a tremendous buffeting of wind that I was tumbled into the sea. Obviously, the "thing" was unaware of me for it continued towards the floating warrior.

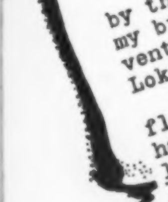
Understandably angry at being knocked into a tailspin by the "thing", and thoroughly wet (when seawater gets in my braids I can't do a thing with them) I hastened to prevent the creature, which I now concluded to be a courier to Loki, the evil one, from stealing the warrior.

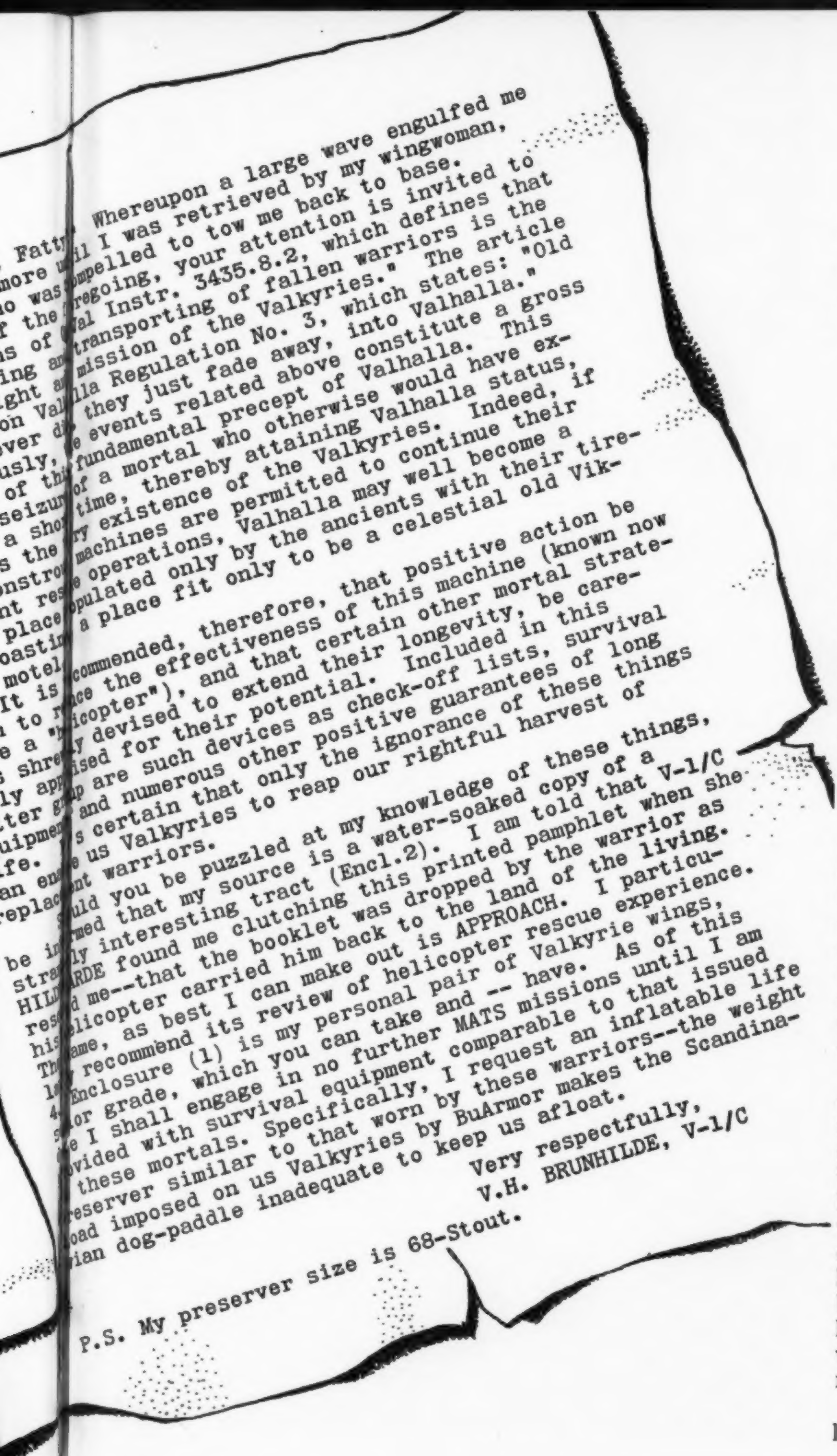
I had nearly reached the spot where the warrior floated; was poised to swoop down for the pickup, when it happened. The "thing" halted above the warrior and, motionless, opened its belly or side to lower a line to which was attached a loop or sling. As I gaped in amazement and frustration, the loop was dropped precisely beside the warrior. Then to my astonishment, the "dead" warrior weakly raised his arm to slip into the sling. (In my consternation over the terrible flying apparition I had neglected to complete my final mortality check -- the warrior was still alive.)

When the warrior was securely attached to the sling, the "thing" slowly pulled the line upward until the warrior was taken inside. Unfortunately, in my eagerness to witness this fantastic sequence of events, I had moved in quite close to the strange machine -- for a machine I now perceived it to be. Moreover, just as the warrior was pulled to the door of the machine, he, possibly because of his recent nearness to Valhalla-status, was somehow able to see me. Of this I am certain, for with a swift movement of his hand he snatched off his golden helmet and flung it straight at my head. So unexpected was the act that I failed to parry the heavy headpiece and the glittering thing struck, like the hammer of Thor, squarely in my eye.

Again I was sent plummeting down out of control into the sea. But not before I obtained one final glimpse of the warrior. He seemed to be waving me farewell -- in an altogether quaint motion of placing a thumb to his nose and vigorously waggling the remaining fingers of his hand.

And as I splashed into the sea for the second time, I fancied I could hear, in the language of the Americas, a triumphant shout of: "Shove off, Stupid! Get yourself




Fatt Whereupon a large wave engulfed me
more u il I was retrieved by my wingwoman,
o was mpelled to tow me back to base.
f the regoing, your attention is invited to
s of al Instr. 3435.8.2, which defines that
ing an transporting of fallen warriors is the
ght an mission of the Valkyries." The article
on Val lla Regulation No. 3, which states: "Old
ver d they just fade away, into Valhalla."
usly, e events related above constitute a gross
of thi fundamental precept of Valhalla. This
seizur of a mortal who otherwise would have ex-
a sho time, thereby attaining Valhalla status,
s the ry existence of the Valkyries. Indeed, if
nstro machines are permitted to continue their
nt res e operations, Valhalla may well become a
place opulated only by the ancients with their tire-
oasti a place fit only to be a celestial old Vik-
motel
It is commended, therefore, that positive action be
n to r ce the effectiveness of this machine (known now
e a "h icopter"), and that certain other mortal strate-
s shre y devised to extend their longevity, be care-
ly app ised for their potential. Included in this
ter g p are such devices as check-off lists, survival
uipmen and numerous other positive guarantees of long
fe. s certain that only the ignorance of these things
an en e us Valkyries to reap our rightful harvest of
eplac nt warriors.
uld you be puzzled at my knowledge of these things,
be in med that my source is a water-soaked copy of a
stra ly interesting tract (Encl.2). I am told that V-1/C
HIL RDE found me clutching this printed pamphlet when she
res d me--that the booklet was dropped by the warrior as
his licopter carried him back to the land of the living.
Th ame, as best I can make out is APPROACH. I particu-
l recommend its review of helicopter rescue experience.
4 Enclosure (1) is my personal pair of Valkyrie wings,
s or grade, which you can take and -- have. As of this
e I shall engage in no further MATS missions until I am
ovided with survival equipment comparable to that issued
these mortals. Specifically, I request an inflatable life
reserver similar to that worn by these warriors--the weight
oad imposed on us Valkyries by BuArmor makes the Scandina-
ian dog-paddle inadequate to keep us afloat.
Very respectfully,
V.H. BRUNHILDE, V-1/C
P.S. My preserver size is 68-Stout.

Brunhilde would be even more impressed to read the following accounts of actual helicopter rescues, which reveal pickup techniques calculated to make the Chief, Valhalla Operations review his SOP.

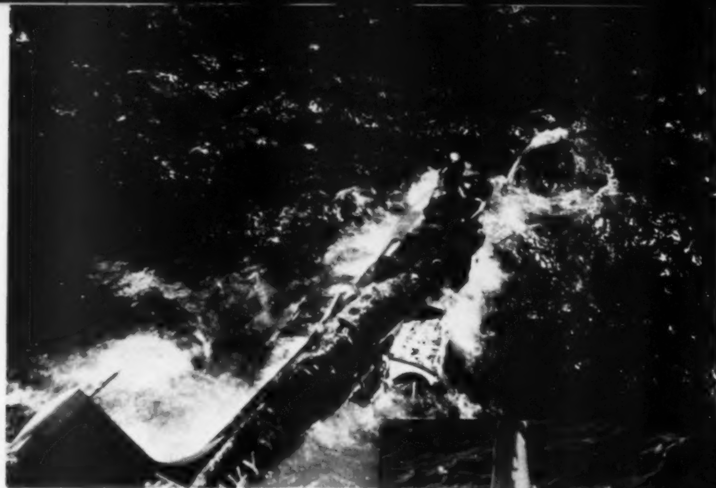
IF you ever have to be rescued by helicopter, the odds are over 7 to 1 that the rescue will be without any special trouble; at least that's what the record seems to show.

In an effort to bring the helicopter rescue story up to date the Naval Aviation Safety Center recently checked three years worth of aircraft accidents in which helicopters participated in the rescue or recovery. *(Note to AAR boards — how about getting the details in your future efforts.)*

The great number of helicopter rescues, evidently so routine as to warrant no detailed report on the circumstances, tends to support the odds for an uneventful pickup. It is also a tribute to the readiness and training of helicopter crews and the personnel who were rescued.

As might be expected, most of the 46 reports which contained any details noted some difficulty during the rescue. These ranged from jammed hoists to communications, with no special area of helicopter rescue operations being highlighted, and might even be considered simply a miscellaneous collection of items which can go wrong during a recovery.

For instance, one pilot was lifted into the helicopter in an



Should you ditch at sea, you are most likely to be rescued by helicopter via the good old sling method. It's the fastest and the easiest for all concerned. On the other hand, if you are unconscious or incapacitated, some other means must be utilized. Since lowering a crewman from the helicopter takes time, and is sometimes unsatisfactory, the following pictures show some of the various nets under development by BuAer. Procurement of a successful design is expected shortly.

unusual and painful manner. "I had just gotten my right arm through the sling," he said, "when the helicopter started pulling me through the water and I discovered that my left ring finger was caught in the middle swivel above the sling. After that I never did get enough slack to get my finger loose so I was hoisted up to the helicopter with most of my weight being carried by the finger. I was holding the sling with my right hand, but that was also putting pressure on the finger."

This gent must have been a stoic of the old school as he ended his report in a matter of fact way. "It was easy to get into the helicopter after I had been hoisted up, and with the slack in the swivel, my finger came loose very easily."

The sling/hoist system caused the major share of trouble in a number of incidents. Four cases where a jammed or inoperative hoist interfered with the recovery were recorded. In one of these, two antisubmarine helicopters were diverted to the scene of a ditching. The first helicopter to arrive over the pilot was unable to do anything because of an inoperative hoist. The second helicopter was able to recover the

pilot about 15 minutes after the accident.

Recommendations to overcome this type of incident called for adding the hoist operation and condition to the check-off list and for helicopters to carry a knotted line or rope ladder to provide an emergency recovery method.

On three occasions the sling was entered backwards. Four others had minor difficulties getting into the sling. Difficulty was caused for two pilots when too little cable was payed out from the helicopter.

Although the hardhat may interfere with your movements in getting into the sling it is recommended that it be retained if possible. One pilot who kept his helmet on was saved from injury or unconsciousness when the weight on the sling hit him on the head. In another instance a man who lost his helmet received slight scalp injuries when entering the helicopter hatch.

A few rescues brought out simple details which hampered the operation. They are significant only that having happening once, they may happen again, with a less fortunate ending.

The accident report concerning one rescue stated that radio communications were made difficult by interruptions by aircraft not associated with the operation. These planes orbited the distressed aircraft and were disconcerting to the helicopter pilot due to the possibility of a mid-air collision.

Another rescue was complicated by communication difficulty when the helicopter was carrying VHF equipment while the rescue CAP was equipped with UHF.

Failure to use available

First of the helicopter rescue nets was developed by Britain's Sproule. U. S. version shown here features collapsibility. Both require a special boom on the 'copter, however.

Some Coast Guard units are using this collapsible net, produced by Air Research.

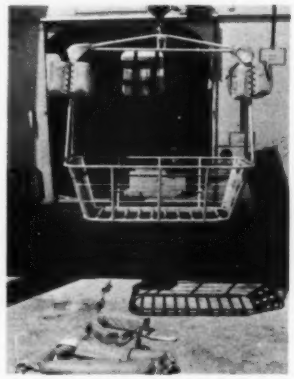
signal equipment caused delay in two rescues. In both cases, because the helicopter was approaching the area, the man in the water assumed he had been sighted. One of these men was sighted strictly by chance. The helicopter pilot had not actually seen anyone and the crewman glimpsed the man in the water as the helicopter flew directly overhead.

A man in the water makes a rather small, elusive target so, if ever you have to wait for a pickup, use *every* means of signaling and marking.

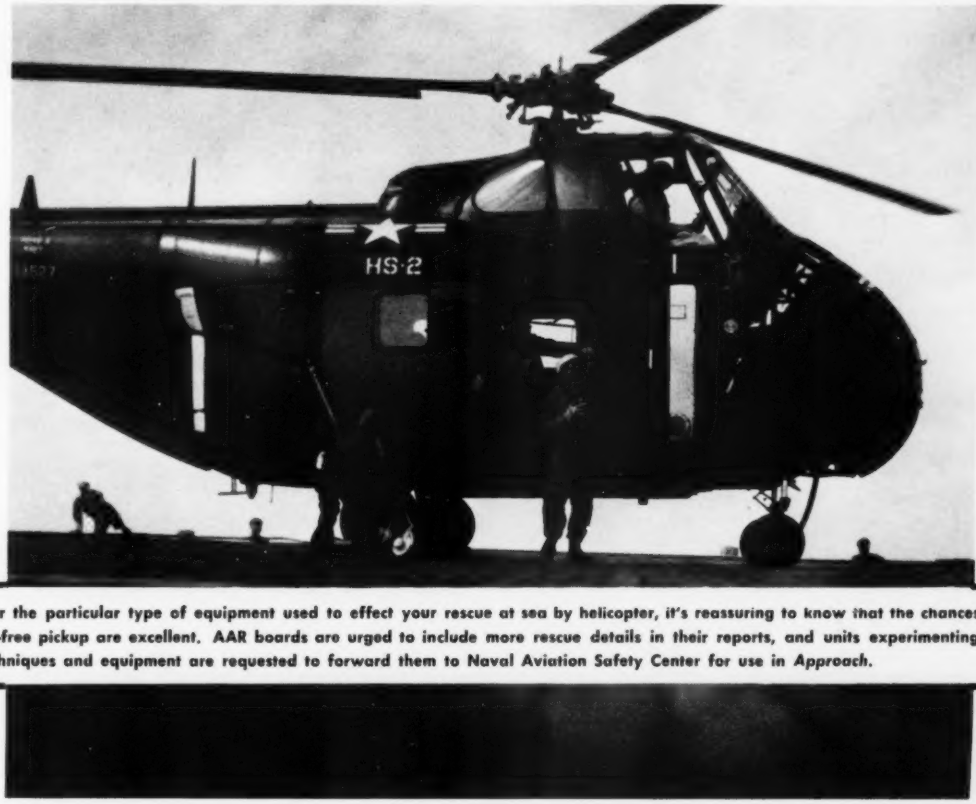
A recommendation which might seem unusual is for the helicopter crewman to have some idea where the emergency canopy release is located on various aircraft. The background for this recommendation comes from an F9F-5 accident where the pilot landed in water short of the runway and could not get his canopy open. Luckily the water was shallow and did not completely cover the top of the fuselage and canopy. A helicopter arrived and the crewman was lowered into the water. Only after several attempts was he able to open the canopy by the emergency release and free the pilot.

In actual practice it does not appear that a pilot will always be able to free his leg straps before hitting the water. If this happens he may be still struggling to get free of the chute as the helicopter approaches. The helicopter pilot must make a careful ap-

This is the Vertol net, specifically designed for the *HUP*.


This basket, developed by the Coast Guard, is being utilized by that service.

Most of the desirable features of other's experiments appear to be combined in this net by Flight Surgeon R. G. Ireland of NAF Weeksville and O. G. Kight, PRC, of NASC.



Whatever the particular type of equipment used to effect your rescue at sea by helicopter, it's reassuring to know that the chances for a trouble-free pickup are excellent. AAR boards are urged to include more rescue details in their reports, and units experimenting with new techniques and equipment are requested to forward them to Naval Aviation Safety Center for use in Approach.

proach as rotor wash can be dangerous to the man in the water by ballooning a collapsed chute or dragging him in the water. In one accident, after ballooning a chute, the helicopter swung away and came in again from the downwind side; the rotor wash effectively collapsing the chute.

Every effort must be made by the man in the water to free himself from parachutes and liferafts before entering the sling.

A pilot who failed to release the liferaft before entering the sling endangered the entire rescue operation. According to the accident report, the added weight and movement of the swinging raft, with sea anchor attached, could have unbalanced the helicopter or swung up into the tail rotor. This is possible with certain types of helicopters.

This last "rescue" is of cartoon quality and points out how the smallest detail, if overlooked, can upset a rescue. In this one the helicopter came over the scene of the accident. The sling was lowered and the pilot put it on.

By this time, however, the helicopter pilot had only intermediate intercommunication contact with his crewman as the crewman's earphones were broken. After hovering for a while the pilot received garbled information that the man was aboard.

However, another helicopter in the area passed the word that the man was not aboard, and was still hanging in the sling. The crewman then reported he was unable to make the hoist reel in. The circuit breaker, hoist switch and pilot's switch on the stick were checked but still the hoist wouldn't move.

Finally the helicopter was lowered so that the man in the sling was standing on a reef and the crewman cut the cable. The downed pilot then was rescued by another helicopter.

It just goes to prove that "the helicopter may be an angel but some days she ain't a lady." ●

If a man have a tent made of linen of which the apertures have all been stopped up, ... he will be able to throw himself down from any great height without sustaining any injury.—*Leonardo Da Vinci (1452-1519)*

down to earth

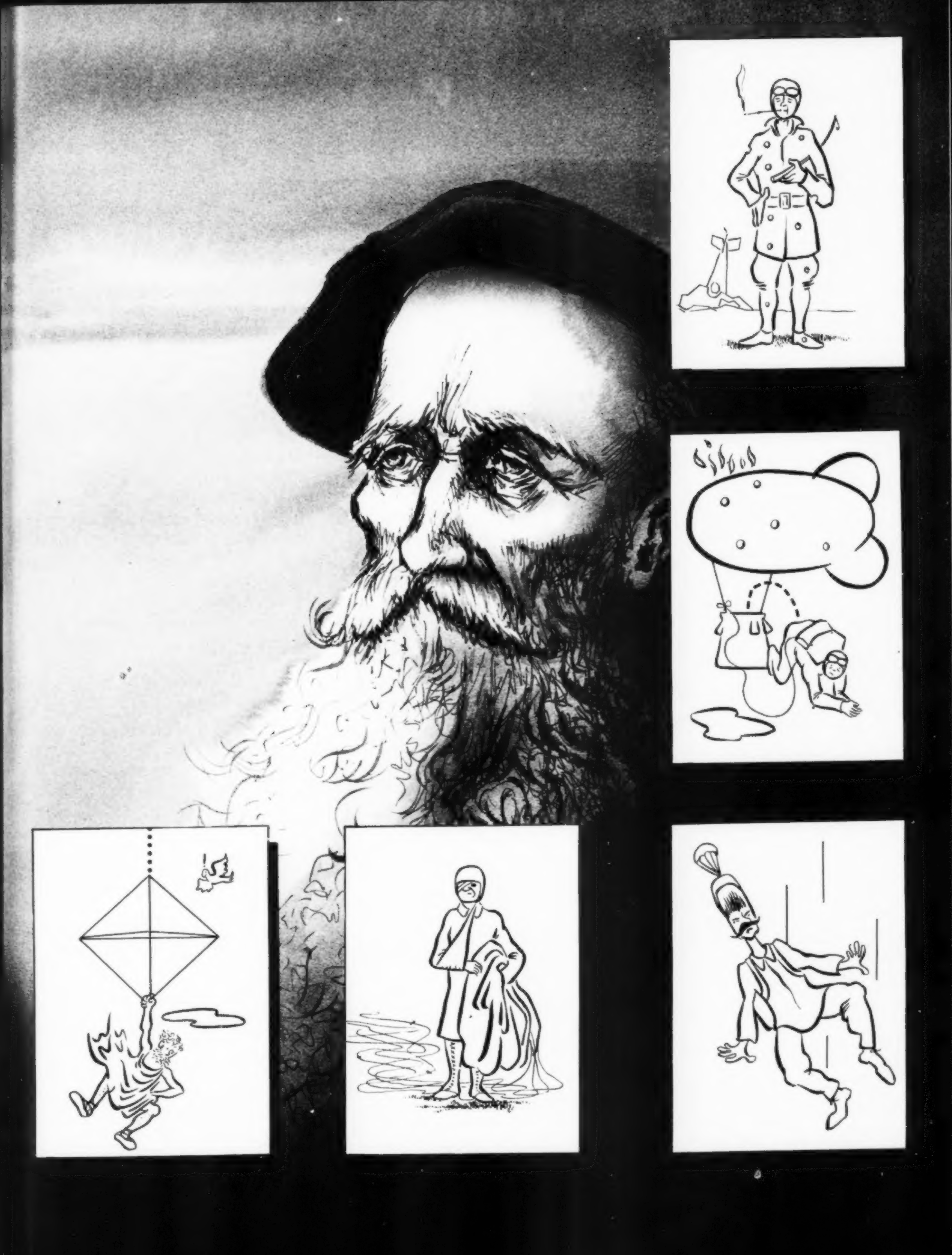
BACK in the year Ought point Oh One, the Chinese toyed with the umbrella as a method of easing the shock of a fall. So did the Siamese high wire artists. But, as manpower was expendable to a much greater degree, and as there really wasn't any requirement for a parachute, the idea was dropped.

Leonardo Da Vinci pulled the idea back out of the pigeon hole the latter part of the 1400s and sketched some workable drawings. He mentioned escape from burning towers or sizzling husbands as the need for such a piece of equipment. The parachute was rigid, and probably hung out from the building. As there were few burning towers and less burning enthusiasm for this novel item, it was put back in the same pigeon hole.

The idea that a man needed equipment to let him descend to the ground was considered stupid by the general public. The reasoning being that you didn't need anything to let you fall to the ground safely if you couldn't get up there in the first place!

These early parachutes were all on the rigid design principle. As the inventors had no limits on weight and space, the size and weight were left to the inventor. There was no canopy deployment problem as it was already deployed,

Please turn page



and for good measure, inflated and rigidly spread on a framework. The only problems were getting enough altitude and someone to use it.

Nothing of value was done on the development of the parachute until 1885 when the collapsible silk chute was presented.

Then in Nineteen Ought Three came the flying machine. Abandoning this flying machine while it was flying was a problem the hitherto neglected parachute answered. A Mr. Grant Morton is reported to have made a premeditated jump from a Wright

Model B in 1911. His parachute was simplicity itself. He gathered it up under his arms, jumped, and threw it out. Captain Albert Berry in 1912 used a parachute with a 32-foot canopy stowed in a container under the airplane. To use the chute, he climbed down the axle and grabbed a bar. As he sat on the bar, his weight pulled the chute out of the cone-shaped case which was hooked onto the airplane. The automatic parachute opener was born. At a height of 2500 feet, he made his first successful jump.

A year before, an Italian inventor received a patent for a flexible parachute embodying the same basic principle of main parachute canopy deployment which is in use today. The method was slightly different. The parachutist wore a very

distinctive and functional leather cap. When he left the airplane, his cap flew off, blossomed out into a small parachute and then pulled out the main canopy from a knapsack on the aviator's back.

In 1914, at the outbreak of WWI, both Allies and Germans used captive balloons for artillery fire spotting. But since the balloons were filled with hydrogen, one tracer bullet made a burning heap of them. There was a race to see if the winching crew could pull the balloon and observer down before they both burned up. This was not always successful. So the French and British started using parachutes in their balloons. The Germans followed. These were the collapsible fabric canopies packed in a conical container and attached to the balloon basket.

When the gas bag got the hot foot, the balloonist, who wore his harness and had the line to the parachute connected to it, jumped over the side. His weight pulled the parachute from the container attached to the basket.

As the balloon was stationary and was always in the same upright attitude, leaving the canopy stowed in the aircraft basket and pulling it out worked fine.

When the bailing-wire-and-tobacco-sack crates called airplanes entered the war, the need for a parachute became apparent. A front-line aviator could expect to live two months. There were no shoulder harnesses and hardhats. There were also few survivors from crashes. When a plane got hit, it usually burned. Without a parachute the pilot could jump out and get killed, or stay with the aircraft and get killed.

The British started utilizing the "guardian angel." As the pilot bailed out, he pulled the static line after him, and the chute was attached to it. The shroud lines and canopy were

stowed in the aircraft. This worked fine, except the static line fouled on the plane too often. So the parachute was put on the pilot, and the static line hooked on the airplane. This worked much better.

Then the war ended. The desperate need for parachutes ended, temporarily.

Fortunately, a few hardy souls out at McCook Field in Dayton, Ohio continued the research. Then, the idea of a *free* parachute occurred to them.

With this type, literally, there were no strings attached to either parachute or airplane. This chute would be opened by the jumper after he had cleared the aircraft.

Many experts made comments that: the jumper would lose consciousness before he could pull the release; he would be paralyzed with fear; windblast would prohibit him using his arms; and other horrible reactions and effects awaited anyone free-falling from an airplane.

Leslie Irvin tested this first free-falling chute on 28 April 1919. It was a complete operational success. Before it could be actually emergency tested, Army Lieutenant Harold R. Harris, while tooling around at about 2500 feet and 150 knots, (remember this was 34 years ago) had the unfortunate experience of his aircraft coming unglued (almost literally, in

those days). After entering a 30-degree dive, he chose to bail out, and did so. After pulling and tugging three times on the rip cord, he looked at it and saw he had been pulling on a harness ring instead. Pulling the rip cord brought about the desired action. The uneventful landing took place atop a grape arbor. This was the first emergency abandonment of an aircraft using a pilot actuated release.

However, aviation advanced. A man does not have time—among other things—to go over the side if he is in a 30-degree dive at 2500 feet and 500 knots; so the ejection seat was born. But at low altitudes man often failed to deploy the

chute prior to reaching the ground.

Ejections at high altitude presented the problem of extremely great opening shock, intense cold which could cause frostbite, and possible death from hypoxia because of the rarefied atmosphere.

There was a need for a reliable automatic parachute opener which would deploy the parachute faster than a man could do it at low altitudes, and would also open the parachute at a preset height if the bail-out was made at higher altitudes. It had to be as reliable as humanly possible, but at the same time must be provided with a manual override in the event of material failure. Such a system is now being incorporated in naval aircraft.

When a pilot ejects, the automatic lap belt separates the seat from the pilot ¾-second after he leaves the cockpit. As the seat separates, the automatic parachute opener is actuated. This does not necessarily mean the parachute opens immediately. If the parachutist is above the altitude set on the barometric release, he will descend free fall until that set altitude is reached. Most Navy equipment will be preset to about 12,000 feet. Then the automatic barometric release is fully actuated, and the parachute rip cord is mechanically pulled.

If the parachutist exits the aircraft below the set altitude, the automatic parachute opener goes into immediate operation, with a minimum delay (about 3 seconds) only long enough for the parachutist to clear the seat and decelerate to a safe parachute opening speed.

Be ye not fearful of that term "delay." The mechanical action is not affected by fear, unconsciousness, hypoxia, forgetfulness or panic. It will do its one job, and do it correctly. It will do it faster and safer than you can. It has proven 99 plus percent effective in tests but even if it doesn't work you still haven't lost a thing. It can still be operated manually. It is a complete success. It can be depended on!

Parachutes and related equipment deserve the same consideration due all other safety, survival and emergency equipment. Important things to remember include:

√ Are you wearing a manual or automatic chute? Until automatic equipment completely replaces the manual, take special mental note of which type you are wearing each time you fly!

√ *If* you operate the lap-belt release manually, you *must* also open the chute manually. It will not open automatically.

√ Apply care, not shoes to the unit.

√ Learn the whys and wherefores of the unit.

√ Use it as designed and intended. ●

Truth and Consequences

A DIGEST OF SIGNIFICANT AIRCRAFT ACCIDENTS

VT

RIGHT, BY GEORGE—The pilot in the front seat of the TV-2 had 3.1 hours and was on a syllabus hop with an instructor. First portion of the flight was altitude work with touch-and-go landings scheduled for the last part of the period.

Landing clearance was received for a touch-and-go and the instructor began a demonstration of a close-in approach at idle power from abeam at 1000 feet. This approach, at idle power, requires a high speed (200 knots) at the 180-degree position and an abeam position that is closer than usual. The speed is gradually reduced throughout the turn with about 150 knots at the 45-degree position.

The purpose of this type approach is to demonstrate the comparatively clean configuration and "floating" characteristic of the TV-2. This attempt failed as the 180 spot was made with 150 knots—the speed for a normal medium power approach.

Low airspeed and an excessive sink rate resulted by the time the 45-degree spot came up. The instructor asked the student if he thought they could make the runway, to which the student said "yes."

According to the accident report, the instructor then continued the approach to demonstrate that he could not make the runway.

The instructor was right, by George. They didn't make the runway.

With a 13-knot crosswind from the left, the right wing dropped and hit the runway as the pilot rotated his plane for takeoff.

CROSSED UP—Prior to accepting delivery on a factory-new FJ-3, a pilot taxiied out for takeoff on a local test flight. Cockpit check and engine run-up was satisfactory and he pulled into position for takeoff.

The duty runway was 8000 feet long with ground temperature 84 degrees. The only objectional condition was a steady 13-knot crosswind between 45 and 53 degrees from the left of the takeoff direction.

Full power was added, brakes released and the roll was begun. At about 90 to 95 knots the pilot rotated the FJ-3 to commence a normal takeoff. At this point, the left wing lifted dropping the right wing low enough to contact the runway. According to the accident board, this was due to pre-stall yaw, a characteristic of the late model FJ-3, and/or the steady state crosswind from the left.

The aircraft veered to the right dragging the starboard wingtip, and went off the runway about 3000 feet from the starting point. The pilot was able to correct the right yaw and continued parallel to the runway, shutting down the engine. However, the plane hit the shoulder of an intersecting runway which sheared the main landing gear and resulted in major damage to the right wing.

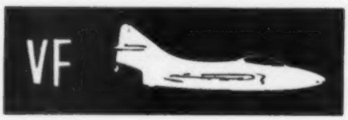
In a discussion of takeoff trim the accident board noted that when the indicator shows "in trim" the control surfaces are set for a maximum performance takeoff. It was considered advisable when conditions are other than ideal to trim slightly nose-heavy for takeoff; that is, the "in trim" indication should just disappear when trimmed nose-down.

This would permit the board's recommendation that sufficient airspeed be obtained during takeoff roll prior to rotation and that lift-off speed be increased by 10 to 15 knots over that normally used when conditions are less than ideal (such as crosswinds).

More briefs next page

"There's times when I wish they'd hurry up with that black box to replace me."

Primary cause of the accident was assigned to the flight leader.



SCRATCH ONE — One of the wingmen in a flight of three F9F-6s has a total of 6.1 jet hours of which 4.1 hours were in the F9F-6. His last flight in the F9F-6 had been a month earlier.

After filing VFR the trio of *Cougars* departed on a cross-country flight. Scattered thunderstorms were forecast near their destination with the possibility that the tops would extend to 35,000 feet. The pilots were briefed orally that the ceilings might lower down to 2000 or 3000 feet in the vicinity of the thunderstorms.

An incident which may have affected the flight leader's later decision to continue on to the destination was the loss of 500 to 700 pounds of fuel on the ground waiting for one member of the flight to have an electrical squawk corrected. Consequently, the reserve fuel available to the flight leader and the wingman in question was limited.

The hop was uneventful. About 65 miles from the flight's destination, however, thunderstorms, which appeared to be a solid front with light spots between them were seen ahead.

A decision was made to try and get under the storm, and the aircraft went down to 14,000 feet. "I saw that the possibility of going under was slim and dangerous because of increased fuel consumption," said the flight leader. After climbing back to 20,000 feet and finding no openings, the leader realized that "we did not have enough fuel to return to a non-military field some miles back."

A thin layer of clouds was entered. These soon became moderately turbulent with lightning. "Suddenly I found myself gaining altitude rapidly," stated the wingman, "and pushed the stick forward without stopping the gain . . .

"I called the leader and told him I had lost contact and was turning right to clear them.

"By this time I was totally on instruments, straight and level. Suddenly the plane rolled to the left and the nose went up. Being slammed around in the cockpit I couldn't control the plane at all. The compasses were spinning, the altimeter unwinding fast, and I was hanging from the seat belt—still being shaken around in the cockpit.

"I decided it was time to leave . . ."

Ejection was successful. The wingman was picked up uninjured.

Meanwhile, the other two pilots bored on through the soup and consumed about eight minutes instrument flying before breaking into the clear over the destination field.

Primary cause of the accident was assigned to the flight leader in that he delayed his decision to alter or reverse course and proceed VFR, with an unqualified wingman, to a known VFR landing field. This delay forced the flight leader to declare an emergency due to low fuel state (1400 pounds) and resulted in the flight being forced to proceed IFR.

By endorsement it was noted that the F9F-6, at 20,000 feet with 1400 pounds fuel, at maximum range power settings will

travel 240 miles and remain airborne 36 minutes. "It is apparent, with the weather behind this flight . . . known to be VFR, many alternatives were available to the flight leader at the time he entered the weather."

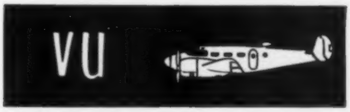
HIGH/LOW TROUBLE — While executing a night searchlight run against a submarine target, the P2V-5F flew into the water, striking in a level attitude at approximately 140 knots. The pilot, copilot and navigator were the only survivors.

From the pilot's statement, he was leveling the aircraft at 300 feet altitude using the radio altimeter, *set on the high scale,* when the first impact was made. He had descended from 500 feet (also read on the radio altimeter high scale) at the rate of 250 feet per minute, *nose down,* in an attempt to *train the searchlight* on the water after it was determined that the elevation control of the light was inoperative!

The copilot was operating the searchlight and maintaining records, and had not scanned the instrument panel since noting 700 feet on the pressure altimeter.

Quoted in the accident report investigation was this paragraph from the All-Weather Flight Manual: "*Caution*—The high range of the AN/APN-1 (radio) Altimeter cannot be relied upon below 500 feet over water and 600 feet over land. Below these altitudes, when on the high range, the indicator will usually read high and may fail to read below 400 feet no matter how close to the terrain the airplane may actually be flying. Therefore, when flying below 600 feet under conditions of poor visibility, the AN/APN-1 indicator should always be on the low range."

Two of the recommendations of the accident board were: (1) use of both the pressure and radio altimeter set on the low scale, when doing low level maneuvers, and (2) crew members not performing specific duties during illumination runs should be in their assigned ditching stations.



DESTINATION FIXATION—Forecast weather for the New York area was "thunderstorm risk, light to moderate rain, light fog, minimum freezing level at 2000 feet, light to heavy icing and light snow." Forecast ceiling and visibility was 1200 feet, overcast with five miles in light rain. Maximum cloud tops were forecast to be near 8000 feet, sloping upward to 22,000 feet near eastern Ohio and eastward to New York.

An SNB on a night flight to New York was equipped with prop anti-icing but did not have wing deicer boots installed. Approaching New York the aircraft reported icing at 9000 feet and requested a lower altitude. ATC was unable to give the flight 8000 feet until about 10 minutes later. Shortly thereafter the SNB was cleared to 4000 feet while proceeding to a holding point and the pilot acknowledged the clearance.

That was the last transmission heard from the aircraft. Water temperature off the coast was 41 degrees, and the survival time without floating survival gear was estimated at three hours. Due to prevailing bad weather, it was impossible to begin a search until dawn of the next day.

One week later a starboard gear wheel and tire from an SNB was picked up by a fishing boat about 15 miles east of Atlantic City, New Jersey. Based on information received from the contractor, serial numbers on the portion of the landing gear assembly positively identified it as belonging to the missing *Beechcraft.*

The accident board's analysis said in part, "From the meager amount of factual information uncovered . . . it is considered this accident resulted from pilot error induced by fatigue, a compelling sense of necessity to reach the planned destination . . . aggravated by severe weather conditions existing in the area . . .

"In addition to the pilot's known concern about his father's recent illness . . . and consequent desire to see him, the copilot and passenger also had compelling reasons for their willingness to tax themselves and the aircraft to the limit, and to continue on into a known area of worsening weather." ●

WHY LOG OVER-TEMPS?

Can jet engine overtemperatures be eliminated?

If not, how can overtemping be minimized?

What course of action should we take to prevent overtemped engines from failing?

The answers to these and related questions are provided by General Electric's Aircraft Gas Turbine Service Unit of Evendale, Ohio.

iling?

A jet engine, due to its design, operates under high temperatures, and if the proper operating temperatures are exceeded, the engine may be rendered unserviceable.

This means that, to obtain the expected life of a jet engine, it is imperative that overtemperatures be eliminated. How are we to eliminate this costly condition?

If we cannot eliminate it, how are we going to minimize this condition?

In the event we do overtemperature an engine, what course of action should we take to prevent this engine from failing? The answers to these and many other questions are necessary if we are to handle this situation effectively.

The purpose of this article is to answer these questions, so that you as an operator of a jet engine, whether you are a pilot or maintenance man, can do a better job of handling this overtemperature problem.

To accomplish our objective we must first understand what is meant by overtemperature operation. Overtemperature is any temperature which exceeds normal operating temperatures for a given condition of engine operation. Overtemperature is not necessarily cause for removal of an engine. In the past it was common to refer to overtemperature as a "hot" start. This of course is true when an overtemperature condition is encountered during starting. However, we do have overtemperatures which happen at

Continued next page

NOTE: Exhaust gas temperatures (EGT) and actions specified by these curves are typical of those for J47 engines. For EGT limits and required action on your particular engine, refer to specifications contained in the applicable operator's handbook.

TURBINE WHEEL SERVICEABILITY CURVES
(NON-ACCUMULATIVE)

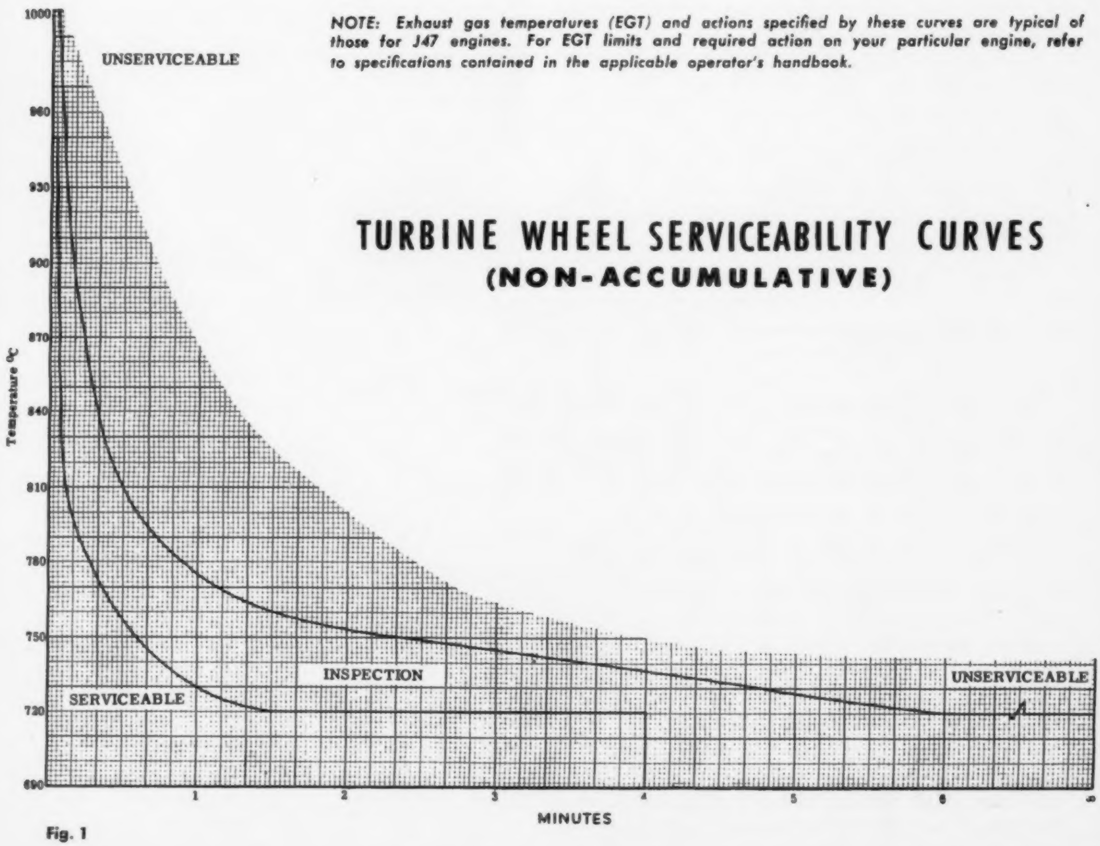


Fig. 1

WHY LOG OVER-TEMPS?

Continued

other times, such as during accelerations, and at steady state operating conditions. This means that we must have exhaust gas temperature limits that will cover all of these overtemperature conditions. (Figure 1)

Now then to examine these EGT limits. The first condition to cover is *starting*. Starting conditions can be defined as engine speeds up to IDLE, providing the acceleration time to IDLE does not exceed two minutes. For example, let's say for one model engine the maximum temperature allowed during a start is 950° C providing we do not exceed two minutes during the acceleration time to idle engine speed. If we exceed 950° C exhaust gas temperature for 2 seconds or more during the start, we have an overtemperature and this condition should be logged by the operator.

EGT limits for starting are very liberal and the reason for this comes from the fact that the turbine wheel is not effected during starts because the stabilized temperature of the turbine wheel rim is not reached, and the only limiting factor during a start is bucket material which permits a more liberal limit. However, when making a start, the most current T.O.s and correct engine operating procedures should be used. In the event we do exceed 800° C for more than 2 seconds during a start maintenance is required as specified by instructions for the specific engine.

For all operating conditions other than starting we have additional overtemperature limits to consider. The first of these is 800°C for more than 2 seconds. If during engine operation, other than starting conditions, we exceed 800°C for

Thermal fatigue caused this J47 turbine wheel failure—Jet-Cal tests showed the engine had been operating 25°C above *indicated* temperature.

more than 2 seconds, this is considered an overtemperature, and we must log this condition. When we record this overtemperature we must log both time and temperature so that the maintenance personnel will be able to determine turbine wheel serviceability.

Note: Forms designed to maintain a detailed history of each jet engine turbine rotor are currently being evaluated by the Bureau of Aeronautics. The form will require logging of all jet engine overtemperatures.

Now, after we log this overtemperature, the maintenance people can take the time and temperature from the form and apply it to the Turbine Wheel Serviceability Curve. (Limits can be determined for any engine by referring to the applicable handbook of operating instructions.) From this curve we can see three conditions that could apply to this overtemperature, depending of course on the magnitude of the temperature and time duration. This shows that the engine is either still serviceable, or that the engine requires an inspection, or if this is a severe overtemperature, the engine must be inspected and the turbine wheel may be unserviceable, depending where this particular overtemperature falls on the curve. It must be remembered that this curve applies to the turbine wheel only and that anytime the turbine wheel is unserviceable, the hot static parts of the engine must also be inspected.

There may be occasions when logged overtemperatures are applied to the Turbine Wheel Serviceability Curve and we find that the engine is still serviceable. For example, if we throttle burst our engine, and during the acceleration an EGT of 810° C for 4 seconds was obtained, this would be an overtemperature and must be logged. However, when the maintenance-people apply this to the Turbine Wheel Serviceability Curve, they find that for this particular engine they are allowed 7 seconds at 810° C. The engine is still serviceable, and no maintenance is required. For another example, suppose during an acceleration we obtain an EGT gas temperature of 810° C for 9 seconds and we log this condition in the proper form. The maintenance people can apply these conditions to the Turbine Wheel Serviceability Curve and will find that the engine must be inspected in accordance with applicable instructions for the specific engine.

At first thought, this may not seem to be too desirable; however, there are good reasons behind this particular method of determining the serviceability of the engine after an overtemperature. First we know that damage to the turbine wheel can result from high temperature. Secondly, we know that the time duration at

An overtemperature condition melted these J33 tail cone vanes.

NUMBER OF PARTS REQUIRING REPAIRING OR SCRAPPING AS A RESULT OF *OVERTEMPERATURE OPERATION* OF 42 ENGINES

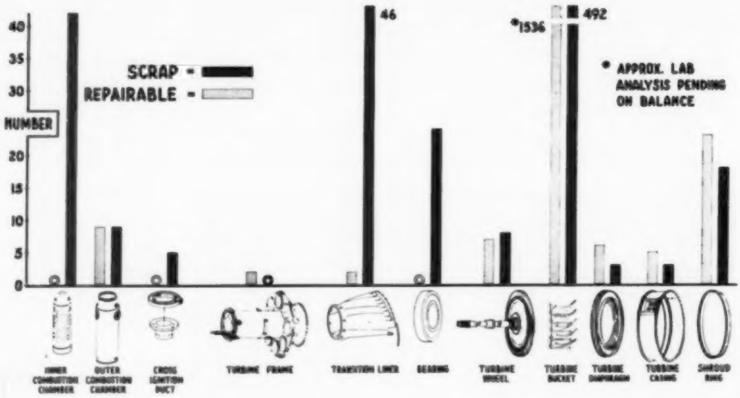


Fig. 2

WHY LOG OVER-TEMPS?

Continued

these temperatures will determine the extent of the damage, so that at relatively low temperatures we are allowed a longer period of time than at high temperatures. This results in a curve from which many temperatures and times can be extracted. It is obvious that this curve would be impractical for the pilot or maintenance man to remember; however, all people concerned should be familiar with the curve. Therefore, for operation we use the EGT limits which are in block form, and for the maintenance people we use the Turbine Wheel Serviceability Curve to determine the necessary action for this overtemperature. This gives us practical EGT limits plus realistic maintenance inspection requirements.

Almost everytime we overtemperature an engine there is maintenance that must be performed on the engine. This results in an unscheduled removal of the engine and consequently extra work for everyone concerned, plus extra cost for the Navy's air arm. To get more for our air power dollar, we must reduce this number of unscheduled removals. A comparison of 42 engines processed by an O&R facility of unscheduled removals due to overtemperature versus scheduled removals for routine maintenance showed that most of these engines fell short, by many hours, of reaching the expected scheduled removal time and that many hours of operation could have been realized had these engines not been overtemperatured.

Figure No. 2 shows the number of individual parts that were scrapped or repairable for these same 42 engines. Fig. No. 3 shows the cost of these parts.

We know the results of exceeding EGT limits with regard to parts damage and cost. It should be obvious that operators of turbojet engines have an extremely important responsibility insofar as logging all overtemperatures that are encountered. The most important reason for logging these overtemperatures is to prevent any engine from failing due to damage caused by overtemperature.

Many things have been accomplished in trying to ease this problem of overtemperature. We now have some engines with automatic starting provisions to take this burden from our

COST OF PARTS SCRAPPED AS A RESULT OF *OVERTEMPERATURE* IN 42 ENGINES

Fig. 3

shoulders. We have revised EGT limits. There have been improvements on the turbine wheel to cope with this problem of turbine wheel serration failures, improvement of metals, fuels and operational (starting) techniques.

The greatest improvement, however, can come from us as individuals. It is a known fact that in most cases of overtemperature, the primary cause is operator error. This is true even though there may be some type of equipment malfunction which would cause an overtemperature. To prove this to ourselves, we need only to analyze a correct starting procedure. If there are indications of an overtemperature condition we can see that by monitoring the start properly we will be able to avoid these overtemperatures. Starting is a prime example since most of our overtemperatures occur at this particular time. We can do the same with other procedures and we will find that a majority of overtemperatures can be avoided.

These are the things which if improved, can reduce overtemperatures to a minimum:

1. When we make field adjustments we want to be sure we are doing it properly, and in the case of EGT it is absoultely essential that we know we are setting in the correct temperature. To do this it is necessary to keep the EGT indicating system properly calibrated. This should be accomplished using the proper equipment (Jet Cal BH 112-J) and existing technical orders.

Note: To accurately determine whether or not the EGT readings are correct, there are certain tests we should use to calibrate the EGT and RPM indicating system prior to actual turn-up. This is done by use of the "JetCal" thermocouple heater probes and adjusting the heat to 650° C. Comparison is then made of the cockpit indicator. If tolerance is exceeded, then we must initiate trouble isolation procedure. To test tachometer calibration, install the JetCal tachometer check circuit, start engine and check calibration at 100% rpm. If the allowable tolerance is exceeded, replacement of the effective unit becomes necessary.

For further detailed information on use of the JetCal unit, refer to NavAer 17-15A-502.

2. We must know the EGT limits that pertain to our particular engine. And more important we must respect these limits.

3. Next, and probably the most effective one, is to use correct operating procedures. If we use correct operating procedures, overtemperatures will be eliminated or at least minimized.

4. We have the responsibility to ourselves and to the new men in the organization to give a new operator a check-out on the proper operation of the engine. This will minimize those overtemperatures that are due to inexperience.

5. Make all field adjustments on the engine properly and within allowable limits. Very seldom do we have trouble with an engine that is adjusted properly. ●

From the Ground Up

Notes and Comments on Maintenance

S2F LANDING GEAR PROBLEM—Failures of the main landing gear shrink link rod ends, Part No. 167170, in the last 13 months have resulted in six S2F/TF-1 accidents and incidents. Four ended up as wheels-up landings. In the fifth case the pilot operated the landing gear lever until the starboard tire blew out and he was able to lower the gear.

One possible cause of the shrink-link rod-ends failures is overinflation of the struts. The HMI, ANO-185SAA2 (Revised April 1956) figure 1-15A page 33 calls for 115 pounds pressure with the strut in the extended position. The pressure with the strut extended in three of these failures exceeded the recommended pressure by as much as 85 pounds. In two failures the strut pressure in the extended position is not known.

Another possible cause of these failures may be due to incorrect adjustment of the main landing gear strut shrink link assembly. This adjustment is to be made in accordance with S2F/TF ASC No. 182. In four of these failures ASC No. 182 was not incorporated.

S2F/TF ASC 231 (Urgent category) incorporates a modified shrink link rod end of increased strength. BuAer msg. 132141Z of Dec. 1956 to all major commands operating S2F/TF aircraft specified that the incorporation of this change should be expedited and that although no effective date has as yet been assigned to the change, the contractor has shipped 275 kits of parts with the balance of kits to be shipped in January.

The incorporation of ASC 231 will increase the reliability of the shrink link rod end. However, strict adherence to the strut inflation and shrink link adjustment instructions are still required for the prevention of accidents and incidents due to this cause.

CRAWL IN CLEAN!—At one field no pattern or reason could be established for J65 engine failures due to foreign object damage. One unit consistently discovered turbine damage on preflight inspections. Another unit operating under similar conditions on the ramps and taxiways, and conducting the same airframe and engine preventive inspections, experienced unexplained series of foreign object damage after becoming airborne.

An opinion developed of the possibility that foreign objects could possibly be introduced by personnel not completely emptying their pockets when making the usual duct and duct check.—

EFFECT OF METHANOL ON MAGNESIUM — The Flight Safety Foundation reports that the examination of a jet which flamed out because of fuel starvation revealed its fuel filter completely obstructed by a jelly-like substance. The substance was *dissolved magnesium.*

The airplane's fuel filter deicer which contained magnesium parts had been serviced with methyl alcohol (methanol) instead of ethyl alcohol. This dissolved magnesium parts into a gelatinous mass which clogged the filter.

Methyl alcohol dissolves magnesium quickly into jelly-like magnesium methoxide. When it dries it becomes magnesium carbonate. Both are insoluble in fuel and water and can clog filters.

Methyl alcohol was added to the fuel tanks of a large aircraft one evening with the idea that this would eliminate in-flight fuel line icing. By the next morning several thousand gallons of fuel had run out on the ramp. The magnesium alloy sump fittings had disintegrated!

S2F/TF WINGFOLD

RECENT attention focused upon the wingfold locking system of the S2F/TF aircraft prompts a comprehensive review of both the problem and the answers.

CNO message 262134Z of November to all major commands operating S2F/TF aircraft emphasized that immediate and positive action is required to insure that all S2F/TF pilots understand the procedures necessary for safe operation.

Pending incorporation of S2F/TF Aircraft Service Change 109 which provides for a positive two-cable winglock system and increased reliability of the visual indicators, the CNO message recommended visual inspection of the 16 locking pins plus the manual lock pin on each wing by the pilot or other well qualified persons prior to each takeoff. It further emphasized that where urgency of operations precludes the above inspection, pilots should visually ascertain that both wing warning indicators are retracted prior to takeoff regardless of other safe indication inside the cockpit.

ComAirLant S2F/TF safety-of-flight message 272029Z of November reported one occurrence involving an aircraft with ASC 109 incorporated, wherein a pilot discovered the visual wing warning indicator in the port wing extended in flight and downward creepage of the wingfold outer lever resulting from the lever not being latched in the full up position. It is considered mandatory prior to each flight that the wingfold outer lever be placed firmly in the full UP position as possible retraction of manual lock pin can result under certain conditions such as vibration and slipstream under the visual warning indicators. With Aircraft Service Change 109 incorporated a latch is provided to lock the outer lever in the UP position.

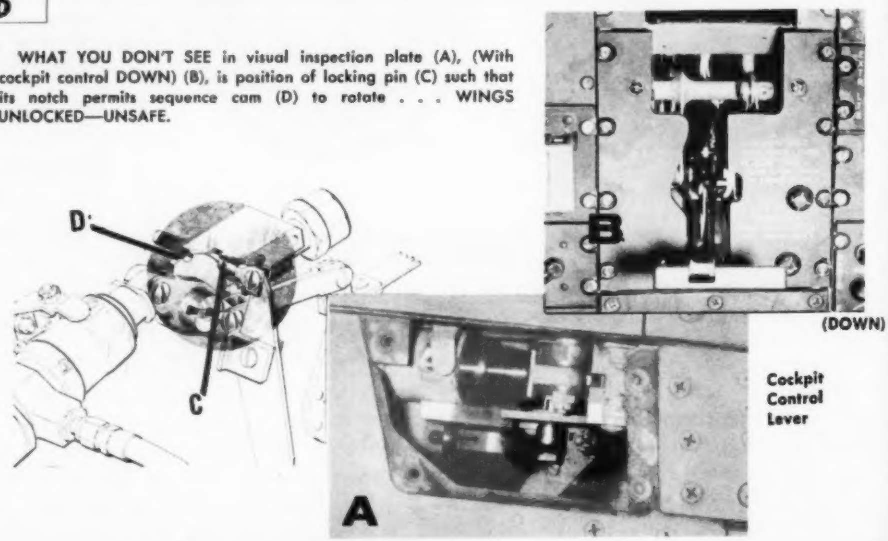
(A subsequent BuAer message, 150305Z Dec '56, cites a case of similar T-handle creepage caused in this instance by improper adjustment of the console push rod, P/N 89F1577-1, allowing only partial lock of the manual uplatch incorporated by ASC 109.)

Shortly after the last wingfold accident a safety of flight AmpFUR was received wherein the wings were spread but the starboard wing failed to lock completely due to an open circuit in the starboard winglock lock strap limit switch. S2F/TF ASC 109 was not incorporated in the aircraft.

In this particular incident. the control panel amber warning light came ON, the hydraulic system pressure dropped to 1500 psi and the wingfold control outer lever was operated normally to the CLOSED position. The starboard wing pins were not actuated when the sequence cam failed to rotate the last ¼-inch of travel but the control panel light came ON and system pressure dropped as a result of the malfunction

AN APPROACH SPECIAL

WHAT YOU DON'T SEE in visual inspection plate (A), (With cockpit control DOWN) (B), is position of locking pin (C) such that its notch permits sequence cam (D) to rotate . . . WINGS UNLOCKED—UNSAFE.



of the lock lock strap limit switch. The visual wing indicator *did not* retract.

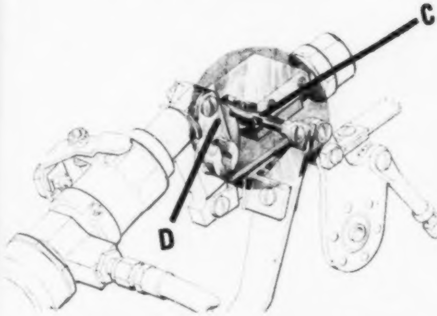
It is extremely important that all pilots and maintenance personnel realize that lighting of the wingfold control panel amber light and the reduction in hydraulic system pressure to 1500 psi indicates *only* that the electrical ground connection is broken to both winglock lock strap limit switches.

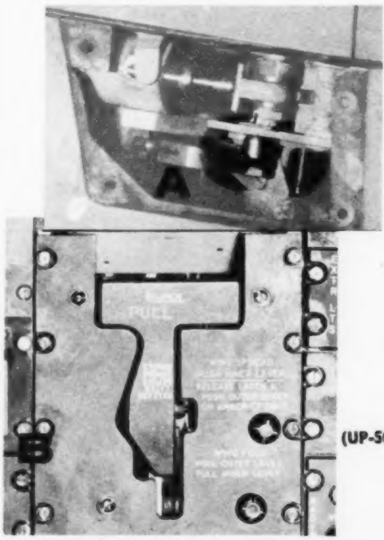
If through a malfunction the circuit to ground is inadvertently open in one limit switch when the wingfold inner lever is placed in the spread position, both wings will spread; but in event of sufficient lag in spread cycle by the wing with the faulty limit switch, that wing will *not* complete its full locking sequence. However, this will always be apparent by non-retraction of the visual wing warning indicator unless additional material failures to the indicator system also occur.

Another aspect of the wingfold problem which is pertinent to maintenance personnel was publicized in NASC S2F/TF safety-of-flight message 292342Z of Nov to BuAer and applicable major commands. It was reported that investigation revealed that the possibility existed that failure of the winglock lock strap limit switch in a recent fatal S2F wingfold aircraft accident was induced by excessively elongating the limit switch striker by brazing a washer on the striker face as an adjustment technique. The proper adjustment of the winglock lock strap limit switch should be achieved by use of adjusting bolt and locknut only.

The incorporation of S2F/TF ASC 109 providing increased reliability to the wingfold system is being expedited. BuAer has directed incorporation of this change in all aircraft prior to release from overhaul activities and field incorporation by contractor personnel. Although it is not the intent to minimize the importance of the expeditious incorporation of this modification, it should be remembered that the adherence by an alert pilot to all prescribed check and inspection procedures relating to the S2F/TF wingfold system is the best insurance against wingfold accidents.

AN APPROACH SPECIAL





(UP-Stowed)

PLACING WING LOCK T-HANDLE IN LOCKED POSITION (B), (Again, (A) is what you see through the visual inspection plate), moves the locking pin notch (C) away from the sequence cam (D) to make the pin a positive lock against further rotation of the cam . . . WINGS LOCKED—SAFE.

With the incorporation of S2F/TF ASC 109, the pilot's wingspread checklist should include:

A. (If wings are already folded.)

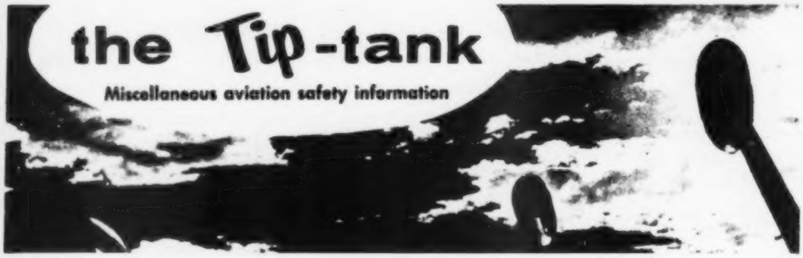
1. Check for removal of struts and spread wings by pushing the fold-spread (inner) lever UP. Wait for completion of automatic portion of spread cycle, as indicated by lighting of the amber wingfold-spread indicator light.
2. Check the hydraulic pressure reading. It should drop from 2700-3000 psi to 1400-1500 psi when the light comes ON.
3. Release the manual latch on the outer (locking) lever and move the locking lever to the stowed position. The amber safety light should go out when the locking lever is stowed. Check to see that the wingfold warning indicators have retracted into the nacelles during this operation.
(Observing that the wingfold warning indicators are retracting into the nacelles, is the most important check and is the most reliable external indication that the wings are safe for flight.)

Do not use excessive force when moving the locking lever into the locked position, as resistance to motion indicates a malfunction in the system.

B. (If the wings are already spread.)

1. Check to see that the wingfold warning indicators are retracted, the locking lever is in the stowed and latched position, the amber indicator light is out and the hydraulic pressure reading is 1400-1500 psi. If any of these conditions are not met, abort the flight until the trouble is corrected.
2. Have a ground observer check the operation of the wing flaps and flight control surfaces.
3. As a final check, observe that the wingfold warning indicators have retracted into the nacelles.

Note: For those aircraft not yet having S2F/TF ASC 109 incorporated, Flight Handbook Revision No. 13 (S2F1/2), and No. 8 (for TF) contain appropriate inspection instructions as modified by CNO msg 262134Z of November 1956: (Requires additional visual inspection of the 16 locking pins plus the manual lock pin in each wing by the pilot or other qualified person prior to takeoff.)



WHAT'S YOUR ALTITUDE?

CNAResTra reminds pilots that misreading of altimeters is the cause of fatal as well as non-fatal accidents. While this isn't news, accidents are still happening particularly to pilots and copilots who don't take enough time to positively read their altimeters.

It's suggested that you review the Air Force's *Flying Safety* magazine article, "Don't Chance a Glance," of December 1954, at least every six months. Copies are available from CNAResTra.

Another approach would be to take the altimeter quiz as presented on the Naval Aviation Safety Center's safety poster entitled "What's Your Altitude?" Just ask us for Poster A89 TR 54, "What's Your Altitude?" and in no time yours will be on the way to you for posting in the readyroom.

FROSTBITE

Allweather Fitron Three reports an instance of pilot being unable to drop out the emergency generator of an A4D-1 at 35,000 feet. Repeated attempts during descent failed to lower the emergency generator, and similar attempts to drop out the generator on the ground by use of cockpit or manual release were also unsuccessful. About five minutes after shutdown, the emergency generator dropped out normally.

Investigation revealed a considerable frost condition on the generator and within the generator compartment.

Recommendation: Check the emergency dropout and inspect the unit for freedom of moisture during the preflight inspection.

Source: AlweaFitron Three dispatch 010230Z

ARRESTING INFO

The Denver Accident Prevention Board reports that emergency arresting gear shear pins do not shear when the emergency arresting gear is engaged. This makes extensive re-rigging necessary and delays making the gear ready for another emergency.

They recommend that a groove be turned in the pins to insure shearing upon engagement of the gear. Additional shear pins must then be ready for re-rigging.

HEADS UP

Attack Squadron 63 notes that as larger numbers of planes are being launched from carriers, and at the same time bringing planes into the landing pattern, it behooves every pilot to be extremely alert when launching or entering the break for landing.

After being catapulted make the clearing turn, proceed to your assigned rendezvous sector making certain to remain below 300 feet until clear of the landing pattern. *When entering the breakup pattern make sure not to "dust" the helicopter when passing the stern of the ship.* Watch for aircraft climbing rapidly off of the catapults when passing the bow of the ship. Pilots of the squadron are also advised to remain at 300 to 350 feet on the upwind leg and break to 200 feet on the downwind leg.

NOTES FROM CAA COLLISION TESTS

- Greatest danger of collision lies in one aircraft overtaking another. Warning to a pilot . . . is not sufficient information . . . relative bearing of an existing collision threat must be known to the pilot to give him enough time to see the other aircraft and execute an avoidance maneuver.
- Time-distance factor becomes a major element in collision prevention of jet aircraft because of the high closure rates.
- Blind areas of aircraft are directly responsible for failure to observe overtaking aircraft. A study of 27 cockpits in all types of aircraft showed that multi-engine private and airline aircraft are more limited in pilot azimuth visibility than either single-engined private aircraft or military jets.
- CAA Technical Development Center Tests indicated that 88 percent of the accidents studied were caused by one aircraft overtaking another.

Most of the collisions occurred in the vicinity of airports with 24 percent taking place over and within airport boundary limits.

ALTIMETER ERROR INFO

The several factors causing altimeter error are discussed in the North American Aviation Service News of 26 October 1956. Included is a chart showing lag values for the pitot-static system in the FJ-4 aircraft equipped with Mach Sensing Trim systems. Get copies from your local rep, or write NAA, Columbus, Ohio.

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OLD PRO CLUB

Howard W. BLEDSOE, ENS

Aircraft: HUP-2, USS BENNINGTON (CVA-20)

Observing preparations for the First Fleet Review from primary flight control in USS BENNINGTON, Ens. **Bledsoe** saw through his binoculars another carrier's HUP-2 damage its rotor while hovering over a Navy tug. Ens. **Bledsoe** immediately determined the only place the crippled helicopter could make an emergency landing was on the BENNINGTON'S deck. He picked up the bullhorn and ordered the after flight deck cleared of personnel forming for the parade. Through his immediate and proper actions, the helicopter was able to make a successful landing on board.

Haland A. DUANE, 1st LT, USMCR-R

Aircraft: F9F-4, NAS Minneapolis

1st Lt. **Duane** had just taken off in an F9F-4 and was at 300 feet, 220 knots, when his engine began vibrating and the RPM increased to 102 percent. He immediately retarded throttle to 97 percent, dumped tiptanks, declared an emergency and made a climbing turn into downwind leg. He continued to climb while engine vibration increased. Anticipating complete loss of power, Lt. **Duane** gained all the altitude he could so as to be prepared for any course of action, including ejection. When he determined that a landing was possible, altitude was then lost by "S"-turning to the runway. He landed without damage and stopcocked the throttle upon touchdown.

Carl H. SELL, LT, USN

Aircraft: WV-2, VW-11

On a routine night takeoff for an Atlantic barrier mission at a gross weight of 139,000 pounds, Lt. **Sell** encountered a wing flap-actuator failure which precluded raising or lowering the wing flaps. At the same time, an electrical fire developed in the cockpit. Unable to dump fuel to lessen his gross weight due to the flaps being partially extended, Lt. **Sell** nevertheless made a perfect night landing at an overgross weight without damage to the aircraft, and while the cockpit fire was still smoking.

Recognition of heads-up flying is essential to a positive program of flight safety. Each month, Approach will acknowledge certain selected individuals whose exhibited flying ability merits membership. Old Pro's also receive a wallet membership card as a memento of the occasion. Commanding officers are invited to submit nominations for selection.

WELL DONE

Aviation Cadet P. G. Friend, Jr., USNR
USNAAS Cabaniss Field, Corpus Christi

Deserving of commendation is the recent accomplishment of Cadet P. G. Friend, Jr., who, with the assistance of his chase pilot and maintenance personnel on the ground, prevented a wheels-up landing which was due to a material failure in an AD aircraft.

Cadet Friend was unable to lower the landing gear because of a hydraulic failure. While circling the field, his instructor, Maj. C. E. DOVE took up a wing position on him. Neither the emergency position of the landing gear control nor G-loading in sharp pullouts would lower the gear.

On the ground, in radio contact with Cadet Friend, Lt. W. O. Hoskinson and Lt. L. C. Hester referred to the Erection and Maintenance Manual to determine the exact location of the releasing mechanism for the landing gear. The manual showed it to be a small actuating cylinder with an emergency selector valve located under the stainless steel deck of the cockpit.

The only way possible for Cadet Friend to get his gear down and avoid a crash landing would be to attempt to cut through the stainless steel deck with the hunting knife he was carrying! Then he could possibly reach the releasing mechanism.

Lt. Hester rushed to one of the ADs on the flight line, had a structural mechanic remove the maintenance hatch on the bottom side of the fuselage, and measure the exact position of the sticking valve.

Now Lts. Hoskinson and Hester were able to radio instructions to the stricken aircraft—where to penetrate the steel flooring, what to feel for, what to move, how to move it. . . .

Bending double in the cockpit, Cadet Friend started chipping away on the deck with his knife. Major Dove, flying on his wing, kept up a continuous radio transmission, directing the busily engaged cadet so that he remained in level flight and in an even bank.

Cadet Friend, doubled over in the cockpit, finally got his knife point through the decking. Then using the knife like a can opener, he made a handsized hole. This took a full hour of work. Fumbling in the void beneath the deck, he reached the trouble-producing hydraulic cylinder. It was bent; but by pulling and wedging, Cadet Friend managed to force the valve and permit the hydraulic fluid to flow in the emergency setting.

Very slowly, the wheels came down, and five minutes later, Cadet Friend taxiied in from an "uneventful" landing. A previous wheels-up landing in an AD at this field had cost $12,500 to repair.

Well Done to all participants!

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